

**MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT
(MPRSA) SECTION 103 EVALUATION**

**EVALUATION OF DREDGED MATERIAL
PENSACOLA HARBOR NAVIGATION
CHANNEL PROJECT**

PENSACOLA, ESCAMBIA COUNTY, FLORIDA



Prepared for:
U.S. Environmental Protection Agency
Region 4
61 Forsyth Street, SW
Atlanta, GA 30303



Submitted by:
U.S. Army Corps of Engineers
Mobile District
109 St. Joseph Street
Mobile, AL 36602



Prepared by:
EA Engineering, Science, and Technology
225 Schilling Circle
Suite 400
Hunt Valley, Maryland 21031



APRIL 2013

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1. DREDGING AND PLACEMENT PROJECT INFORMATION

The subject of this evaluation is the placement of dredged material from the Pensacola Harbor Federal Navigation Channel (Pensacola Harbor Channel) in the Pensacola Offshore Ocean Dredged Material Disposal Site (ODMDS). The Pensacola Harbor navigation channel serves the needs of Naval Air Station Pensacola as well as commercial needs of the Port of Pensacola. The U.S. Army Corps of Engineers-Mobile District (USACE-Mobile District) maintains the Pensacola Harbor Channel, which provides access to Pensacola Harbor from the Gulf of Mexico (Figure 1). Proper management of the Pensacola Offshore ODMDS will assist in satisfying the long-term dredged material placement needs of the channel segments maintained by USACE-Mobile District.

The Pensacola Offshore ODMDS is located in the Gulf of Mexico, approximately 11 miles south of the Pensacola Pass (Figure 2). It was designated by USEPA Region 4 in 1988 for fine-grained material dredged from the Pensacola area that meets ocean placement criteria, but is not suitable for beach nourishment or placement at the Pensacola Nearshore ODMDS (USEPA/USACE 2005). The estimated capacity of the target placement area within the Pensacola Offshore ODMDS is approximately 12 million cubic yards (mcy) (USEPA/USACE 2005) and is sufficient to meet the maintenance dredging needs for the Pensacola Harbor Channels.

- a. Dredging Location.** The existing Pensacola Harbor Channel provides for an Inner Harbor Channel -33 feet deep (mean lower low water [MLLW]), 500 feet wide, and 3,950 ft long; a Harbor East Channel maintained at -33 feet (MLLW) and 300 feet wide; and a Bay Channel at -33 feet deep (MLLW) and 300 feet wide. The channels are dredged to the authorized depth plus an additional 2 feet for over depth allowance and an additional 2 feet for advanced maintenance.
- b. Geotechnical Borings.** No geotechnical borings from the Pensacola Harbor Channel were collected for submittal with this Section 103 Evaluation.
- c. Volume of Material to be Dredged.** Approximately 700,000 cubic yards (cy) of material will be dredged as part of the Pensacola Harbor project. Dredging and subsequent placement in the Pensacola ODMDS will be conducted using a hydraulic cutterhead dredge. The Pensacola Harbor Channel is divided into three reaches, and dredging volumes for each are summarized below:

Channel Reach	Type of Dredging	Approximate Volume (cubic yards)	Project Depth* (ft MLLW)
Pensacola Inner Harbor	Maintenance	250,000	37
Pensacola East Channel	Maintenance	190,000	37
Pensacola Bay Channel	Maintenance	300,000	37

*project depth = 33 ft MLLW; proposed depth includes an additional 2 feet for advanced maintenance and 2 feet for over depth allowance.

d. Grain Size of Dredged Material.

The sediments from the **Pensacola Inner Harbor** were comprised mostly of silt + clay, ranging from approximately 94 to 99 percent; the only exception was PEN12-01, which had a silt+clay of 66 percent. The sediments from each location in the Pensacola Inner Harbor were classified as high plasticity clay, using the Universal Soil Classification System (USCS) (Table 1, Figure 3).

The sediments from the **Pensacola East Channel** were comprised mostly of silt+clay, ranging from approximately 95 to 98 percent. PEN12-05 had a slightly lower percentage of 90.8. The sediment from three of the four locations in the Pensacola East channel was classified as high plasticity silt. The fourth location, PEN12-05, was classified as high plasticity clay (Table 1, Figure 3).

The sediments from the **Pensacola Bay Channel** were comprised predominantly of silt+clay, ranging from approximately 88 to 96 percent. Three of the four locations in this channel reach were classified as high plasticity clay. The fourth location, PEN-10, was classified as high plasticity silt (Table 1, Figure 3).

Two reference sites – RS-MOB-C and RS-PEN-D – were sampled for this project to find an appropriate reference site with a grain size similar to that of the project sediments to use for the bulk sediment and ecotoxicological comparisons. As indicated above, project sediments were predominantly silts and clays. The sediment from location RS-PEN-D was approximately 97 percent, so this reference was not used. The Mobile reference site, location RS-MOB-C, had a composition of 80 percent sand and 20 percent silt+clay and was classified as a silty sand. Therefore, results of the bulk sediment and ecotoxicological testing of the Pensacola Harbor Channel sediments were compared to results from the Mobile (RS-MOB-C) reference site.

e. Bathymetric Information. Bathymetric surveys of the Pensacola Harbor Channels were conducted by USACE-Mobile District prior to the initiation of sampling, and areas of shoaling were identified as target locations for the sediment sampling. The most recent surveys (February 2012) are provided in Attachment I.

f. Description of the Disposal Area. The Pensacola offshore ODMDS is located in the Gulf of Mexico approximately 11 miles south of Pensacola Pass (Figure 1-2). The site covers a 6-square mile rectangular area, with a bottom surface that generally declines in an

easterly/southeasterly direction at elevations ranging from -63 to -93 feet MLLW. It was designated by UESPA Region 4 in 1988 for fine-grained material dredged from the Pensacola area that meets the ocean placement criteria, but is not suitable for beach nourishment or placement at the USEPA-designated Pensacola nearshore ODMDS. Previous maintenance dredging studies have concluded that dredged material from Pensacola Harbor does not meet the criteria for disposal at the nearshore ODMDS (USEPA/USACE 2005).

The boundary coordinates of the Pensacola Offshore ODMDS are (USEPA/USACE 2005):

Boundary Coordinates

Latitude	Longitude
30°08'50" N	87°19'30" W
30°08'50" N	87°16'30" W
30°07'05" N	87°16'30" W
30°07'05" N	88°19'30" W

g. Expected Method(s) of Dredging, Transport, and Disposal. The dredging, transport, and placement of proposed dredged material at the Pensacola offshore ODMDS are expected to be performed by hydraulic cutterhead with dump scows.

h. Expected Start, Duration and End of Dredging. The dredging for the Pensacola Harbor Channel is anticipated to start in late 2013 or early 2014. Maintenance of the channels, thereafter, will be conducted on an as-needed schedule, based on the rate of shoaling in the channel, as documented by annual bathymetric surveys.

i. Proposed Disposal Location (or Zone) within the Pensacola Offshore ODMDS.

The dredged material will be excavated using a hydraulic cutterhead with dump scows, transported to the Pensacola Offshore ODMDS, and placed in a designated placement zone. Bottom currents within the Pensacola offshore ODMDS are 30cm/sec or less approximately 70 percent of the time, and surveys have indicated that the containment berms have remained stable since construction. The proposed placement zone within the Pensacola Offshore ODMDS for the dredged material will be determined based on consultation with USEPA Region 4 and USACE-Mobile District. Progress bathymetric surveys of portions of the active zone during placement periods will be utilized, if warranted, to ensure proper placement of materials.



Figure 1. Pensacola Harbor Channel Sampling Locations, 2012



Figure 2. Reference site locations and ODMDS location: Pensacola Harbor Channel, 2012

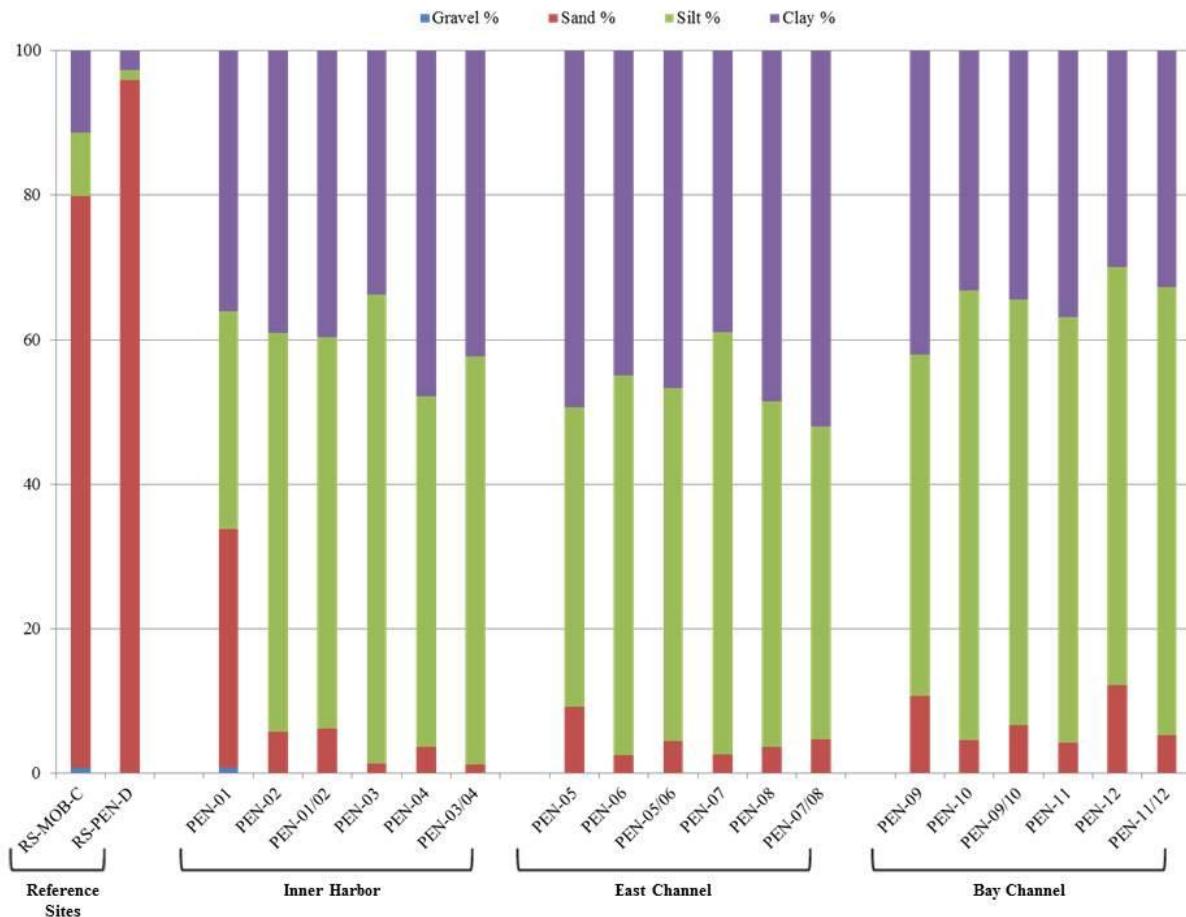


Figure 3. Grain Size Distribution in Pensacola Harbor Channel and Reference Site Sediments *Source: EA Engineering, Science and Technology, Inc. 2013*

j. Compliance with Pensacola Offshore ODMDS Site Designation and SMMP Conditions. USEPA and USACE manage the Pensacola Offshore ODMDS through a joint Site Monitoring and Management Plan (SMMP) (USEPA/USACE 2005). Use of the site for dredged material placement will comply with site requirements. USACE-Mobile District conducts periodic bathymetric surveys of the ocean disposal sites when site activity warrants.

2. EXCLUSIONARY CRITERIA

The exclusionary criteria apply to material which meets any of the following three criteria (40 CFR Part 227.13) to be considered environmentally acceptable for ocean placement without further Tier II (chemical) or Tier III (ecotoxicological) testing:

1. The dredged material is comprised predominately of sand, gravel, rock, or any other naturally occurring bottom material with particle sizes larger than silt, and the material is found in areas of high current or wave energy.

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2. Dredged material is for beach nourishment or restoration and is comprised predominately of sand, gravel, or shell with particle sizes comparable with material on the receiving beaches.
 3. When:
 - i) the material proposed for placement is substantially the same as the substrate at the proposed placement site; and
 - ii) the site from which the material proposed for placement is to be taken is far removed from known sources of pollution so as to provide reasonable assurance that such material has not been contaminated by such pollution.

The material proposed for dredging from the Pensacola Harbor Federal Navigation Channel does not meet the exclusionary criteria set forth under 40 CFR Part 227.13(b). Analysis of the project grain size data indicates that sediments from the Pensacola Harbor Channels are less than the 88% sand requirement needed to meet the “predominantly sand” definition according to the *Southeast Regional Implementation Manual (SERIM)*. Therefore, tiered testing in accordance with 40 CFR Section 227.32, and following protocols in the *Ocean Testing Manual* (USEPA/USACE 1991) and the *SERIM* (USACE-South Atlantic Division/USEPA Region 4 2008) were conducted to determine if the proposed dredged material from the Pensacola Harbor Channels meets the limiting permissible concentration (LPC) for ocean placement at the Pensacola Offshore ODMDS. Results of the testing program are summarized in the sections below and in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel Project, Pensacola, Escambia County, Florida* (EA 2013).

3. NEED FOR TESTING FOR OCEAN PLACEMENT (TIER 1)

a. Locations, Quantities, and Types of Pollutants Discharged Upstream of the Dredging Area. There are no known recent incidents of pollutants that have occurred in the vicinity of the project area immediately before or after the September/October 2012 sampling that might influence the sediment chemistry or bioassay results.

b. History of Dredging in Area. The project under evaluation is maintenance dredging. Maintenance dredging of the Pensacola Harbor Channels is conducted as needed to maintain navigable depths within the channel.

c. Results of Previous Testing. Previous sampling of the Pensacola Inner Harbor, Pensacola East Channel and Pensacola Bay Channels included bulk sediment analysis, elutriate testing, water column bioassays, whole sediment bioassays, and bioaccumulation studies of sediment samples proposed for maintenance dredging. The most recent sampling event prior to 2012 was conducted by EA Engineering, Science, and Technology, Inc. in 2001 (EA 2002).

A total of twelve Pensacola Channel locations were sampled during the 2001 investigation – five locations in the Inner Harbor Channels (which included the East Channel), four locations in the Mid-Bay (the Bay Channel), and three locations in the South-Bay (the southernmost portion of the channel that runs parallel to Santa Rosa Island). The Pensacola Bay reference site for the 2001 study was located on the east side of the Pensacola Bay Bridge.

In 2001, the bulk sediment testing consisted of analyses for metals, chlorinated and organophosphorus pesticides, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, semivolatile organic compounds (SVOCs), ammonia, cyanide, total sulfides, acid volatile sulfides (AVS), total Kjeldahl nitrogen (TKN), total organic carbon (TOC), total phosphorus, nitrate, nitrite, grain size, specific gravity, and total solids. Elutriates were prepared using site water collected from one location within Pensacola Harbor and using sediments from each channel station. Elutriates were tested for the same suite of chemical analytes as the sediment samples.

The results from the Pensacola Harbor Channel investigation (EA 2002) met the Limiting Permissible Concentration (LPC) for water quality criteria, water column toxicity, and benthic toxicity. In addition, the results of the bioaccumulation exposure indicated little potential for bioaccumulation of contaminants.

d. Locations for Previous Testing. Locations of previous testing can be found in *Evaluation of Dredged Material from Pensacola Harbor, Escambia County, Florida* (EA 2002).

e. Recent Events Influencing Testing Results. On 20 April 2010, *The Deepwater Horizon* exploded in the Gulf of Mexico while drilling on the Macondo oil well approximately 41 miles southeast of Louisiana. Oil from the well spilled into the Gulf until it was capped on 15 July 2010.

Surficial sediment sampling was conducted in the Pensacola Bay Entrance Channel after the Deepwater Horizon Oil Spill to determine if the surface sediments were impacted by the oil spill (EA 2012b). Sampling was conducted in December 2010, and sediments were tested for PAH and total petroleum hydrocarbon (TPH) [diesel range organics (DRO) and gas range organics (GRO)] concentrations. The results of this sampling indicated that concentrations of PAHs and TPH (DRO and GRO) were low, and that there was no discernible evidence that the sediment quality had been impacted by the Deepwater Horizon Oil Spill.

4. TESTING PROGRAM

The Sampling and Analysis Plan (SAP) for the Tier 2 and Tier 3 testing for the Pensacola Harbor Channels was submitted to, and approved by, USEPA Region 4 in September 2012. In late September 2012, tiered testing following protocols in *The Green Book* (USEPA/USACE 1991) and the *Regional Implementation Manual, Requirements and Procedures for Evaluation of Ocean Disposal of Dredged Material in Southeastern Atlantic and Gulf Coastal Waters* (SERIM) (USACE – SAD/USEPA Region 4 2008) was initiated for six composite samples prepared from 12 locations within three dredging units in the proposed dredging area (Figure 1). Two reference sites (Figure 2) were also sampled. Results of the studies and a description of the sampling and chemical testing methodologies are detailed in the Sampling and Analysis Plan (SAP) (EA 2012) and in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel Project, Pensacola, Escambia County, Florida* (EA 2013). A copy of the report is enclosed (electronic version) with the Section 103 Evaluation.

Six (6) composite sediment samples from the Pensacola Harbor Channel Project were sampled and submitted for Tier 2 and Tier 3 testing and analysis (Figure 1):

- Pensacola Inner Harbor - two dredging unit composites,
- Pensacola East Channel - two dredging unit composites, and,
- Pensacola Bay Channel - two dredging unit composites.

Water targeted for chemical analysis and elutriate preparation was collected from three locations within the project area (one from each Dredging Unit) and receiving water was collected from one location in the Pensacola Offshore ODMDS. Reference sediment was collected from two locations – RS-MOB-C and RS-PEN-D.

a. Sediment Testing. Target analytes for the 2012 maintenance dredging sediment testing were chosen based on consultation with USEPA-Region 4. Results of the physical and chemical testing of the bulk sediment from the Pensacola Harbor Channel and comparisons to marine sediment quality guidelines (SQGs) [MacDonald et al. 1996; Canadian Council of Ministers of the Environment (CCME) 2001] are summarized in Tables 1 through 9. Bulk sediments, site water, and standard elutriates were tested for the following target compounds:

- metals,
- chlorinated pesticides,
- polychlorinated biphenyl (PCB) congeners,
- semivolatile organic compounds (SVOCs),
- polycyclic aromatic hydrocarbons (PAHs),
- dioxin and furan congeners,
- ammonia ($\text{NH}_3\text{-N}$),
- total Kjeldahl nitrogen (TKN),
- nitrate+nitrite,
- total phosphorus,
- total organic carbon (TOC),
- total sulfide,
- cyanide,
- butyltins,
- simultaneously extracted metals (SEM) (sediment only), and
- acid volatile sulfides (AVS) (sediment only).

In addition, the following physical analyses were conducted for each of the twelve individual sediment samples as well as the six composite sediment samples:

- grain size determination,
- Atterberg limits,
- specific gravity,
- total solids, and
- Unified Soil Classification System (USCS).

Detailed results of the bulk sediment testing from 2012 are provided in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel, Pensacola, Escambia County, Florida* (EA 2013).

b. Water Column Elutriate Testing. A site water sample was collected from one location within each of the Dredging Units for chemical analysis and preparation of standard elutriates. The site water, along with six of the composite sediment samples were used to create the six standard elutriates:

- Pensacola Inner Harbor - two dredging unit composites,
- Pensacola East Channel - two dredging unit composites, and,
- Pensacola Bay Channel - two dredging unit composites.

Results of the elutriate and site water chemical analyses and comparisons to USEPA saltwater acute water quality criteria for aquatic life (USEPA 2012) are summarized in Tables 10 through 17. Receiving water from the Pensacola Offshore ODMDS was also collected and submitted for chemical analysis for use in the STFATE modeling. Details of the elutriate analysis are provided in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel Project, Pensacola, Escambia County, Florida* (EA 2013).

c. Water Column Bioassays. As per 40 CFR Part 227.27(c) requirements that at least three species representing phytoplankton or zooplankton, crustacean or mollusk, and fish be chosen for testing, three species of organisms – *Mytilus galloprovincialis* (blue mussel) (plankton), *Americanopsis bahia* (opossum shrimp) (crustacean), and *Menidia beryllina* (inland silverside) (fish) – were tested in the water column bioassays for the Pensacola Harbor Channel sediments. The three species chosen represent different phyla and cover a range of differing species sensitivities (USEPA/USACE 1991 and 1998). Each of the three water column species, *M. galloprovincialis* (blue mussel), *A. bahia* (opossum shrimp), and *M. beryllina* (inland silverside), were exposed to a standard dilution series of elutriates (100, 50, 10, and 1 percent) created from the project sediments. In addition, the elutriate preparation water (site water), and a laboratory control were tested in each of the water column bioassays. The blue mussel tests measured developmental effects to embryos and the opossum shrimp and inland silverside tests measured effects to organism survival. The test protocols are detailed in the Sampling and Analysis Plan (SAP) (EA 2012) and in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel Project, Pensacola, Florida* (EA 2013). Results for water column bioassays for each dredging unit are summarized in Table 18 and are discussed below in Section 6.

STFATE Modeling and Limiting Permissible Concentration (LPC) Compliance

To determine the LPC compliance for proposed maintenance dredged material from the Pensacola Harbor Channel project, the Short-Term Fate of Dredged Material Disposal in Open Water (STFATE) model was used to model the behavior of the sediment during placement at the Pensacola Offshore ODMDS (Attachment II). USEPA Region 4 requested application of a bulking factor to the volumetric fraction of sediment used in the STFATE model. The sediments from the Pensacola Harbor Channel are primarily comprised of silts and clays in each of the three dredging units (ranging from 66 to 99 percent silt+clay). To be consistent with the approach used for previous USEPA Region 4 projects and because the sediments in the

Pensacola Harbor Channel are predominantly comprised of silts and clays, a bulking factor of 2.5 was used for each dredging unit in the STFATE model.

Initial STFATE modeling indicated that the dilution factors required to meet the LPC for water quality criteria and water column toxicity were achieved quickly following placement. To maximize the dredged material volume that could be placed at the Pensacola Offshore ODMDS during a single placement event and achieve compliance with the LPC for water column criteria and water column toxicity, additional STFATE model scenarios were conducted.

Results of the Tier 2 STFATE modeling take into account the background (receiving water) concentration of the modeled constituent (ex. ammonia), and are summarized using the dilution factor that the plume achieves above background concentrations. Results of the STFATE Modeling for Tier 2 (water quality criteria) are summarized in Tables 19A through 19C.

Results of the Tier 3 STFATE modeling compare the total dilution achieved by the plume after 4-hours to 0.01 of the EC₅₀ value. Results of the STFATE modeling for Tier 3 (water column toxicity) are summarized in Tables 20A through 20C.

5. BENTHIC DETERMINATION

a. Benthic Toxicity Evaluation. As per 40 CFR Part 227.27(c) requirements, two species of organisms with different feeding mechanisms representing filter feeding, deposit feeding, and burrowing – *Neanthes arenaceodentata* (estuarine polychaete) (deposit feeding and burrowing) and *Leptocheirus plumulosus* (marine/estuarine amphipod) (filter feeding) – were tested in the whole sediment bioassays for the Pensacola Harbor Channel sediments. The organisms used for the whole sediment bioassays were chosen to cover the range of differing species sensitivities and to be environmentally protective (USEPA/USACE 1991 and 1998). The tests were conducted as static, non-renewal tests with 10 days of exposure to the whole sediments and overlying water and measured survival in Pensacola Harbor Channel sediments as compared to survival in the reference sediment. The test protocols are detailed in the SAP (EA 2012) and in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel Project, Pensacola, Escambia County, Florida* (EA 2013). Results of the whole sediment bioassays for each dredging unit are summarized in Table 21 and are discussed below in Section 6.

LPC Compliance

The evaluation of benthic-effects for whole sediment bioassays is based on the LPC. The LPC is defined as "...that concentration which will not cause unreasonable acute or chronic toxicity or sublethal adverse effects based on bioassay results using...appropriate sensitive marine organisms..." (USEPA/USACE 1991 and 1998). The dredged material proposed for placement does not meet the LPC if the mortality of the test organisms (1) is statistically greater than mortality in the reference sediment, and (2) exceeds the reference sediment mortality by at least 10 percent (or 20 percent for amphipod tests).

b. Benthic Bioaccumulation. Sediments from the Pensacola Harbor Channel were evaluated in 28-day bioaccumulation studies with *Nereis virens* (sand worm) and *Macoma nasuta* (bluntnose clam). The studies measured survival of the test organisms and the potential for bioaccumulation of contaminants in organism tissue as a result of exposure to Pensacola Harbor

Channel sediment composite samples. The bioaccumulation exposure and chemical testing protocols are detailed in the SAP (EA 2012) and in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel Project, Pensacola, Escambia County, Florida* (EA 2013). Survival data from the 28-day bioaccumulation tests with *N. virens* and *M. nasuta* are provided in Table 22.

Tissue Contaminant Analysis

Following review of the bulk sediment data and completion of the 28-day bioaccumulation exposures, USACE-Mobile consulted with USEPA-Region 4 to determine the target constituents of concern for tissue analysis. USEPA-Region 4 requested that the following constituents be tested:

Chemical Analyses Performed on Tissue Samples

Reference Site	Pensacola Inner Harbor		Pensacola East Channel		Pensacola Bay Channel		
	RS-MOB-C	PEN12-01/02	PEN12-03/04	PEN12-05/06	PEN12-07/08	PEN12-09/10	PEN12-11/12
Metals	X	X	X	X	X	X	X
Dioxin/ Furan Congeners	X	X	X	X	--	--	--
PAHs	X	X	X	X	--	--	--
PCBs	X	X	X	X	--	--	--
Chlorinated Pesticides*	X	X	X	--	--	--	--
Butyltins	X	X	X	X	--	--	--

*Pesticides tested include DDE, DDD, and DDT.

Pre-test tissue (tissue from organisms not used in the bioaccumulation exposures) were retained for chemical analysis to evaluate the concentration of target analytes of the organisms prior to exposure to test sediments. Tissue samples were stored frozen and removed to thaw prior to analysis.

Tissue Chemistry Results

Detailed results of the tissue chemistry analysis are provided in *Evaluation of Dredged Material: Pensacola Harbor Navigation Channel Project, Pensacola, Florida* (EA 2013). Results of the tissue analysis for *N. virens* and *M. nasuta* are summarized in Tables 23 through 29. Pre-test tissues concentrations that compare post-exposure tissue concentrations to pre-exposure tissue concentrations for each dredging unit are also provided in Tables 23 through 29 and discussed in Section 6.

Comparison to USFDA Action/Guidance/Tolerance Levels

Upper 95 percent confidence levels of the mean (UCLM) tissue-residue concentrations for arsenic, cadmium, chromium, lead, mercury, and nickel in worm and clam tissues exposed to Pensacola Harbor Channel sediments were compared to U.S. Food and Drug Administration

(USFDA) Values (USFDA 2001, 2000) (Table 29). None of the UCLM values for Pensacola Harbor Channel tissues exceeded the USFDA Action/Guidance/Tolerance Values for metals.

6. RESULTS FOR EACH DREDGING UNIT

a. Pensacola Inner Harbor

Four individual sediment samples were tested for physical characteristics and two composite sediment samples were tested for physical, chemical, and ecotoxicological characteristics from Pensacola Inner Harbor. The results from the sediment testing are summarized in Tables 1-9.

The sediments from the Inner Harbor were predominantly comprised of silt + clay and were classified as high plasticity clay (Table 1). A total of 17 constituents - five metals (arsenic, chromium, lead, mercury, and nickel) (Table 3), eight PAHs (Table 4), total PAHs (Table 4), total PCBs (Table 5), two chlorinated pesticides (DDT and DDE) (Table 6) – were detected between the TEL and PEL values in at least one of the Inner Harbor Channel composites. None of the detected concentrations exceeded the PEL values. The dioxin TEQ in the Inner Harbor Channel sediment ranged from 26.2 to 35.5 ng/kg (Table 7).

Water Quality Criteria (WQC) (Elutriate Analysis) and Water Column Toxicity (Liquid and Suspended Phase Bioassays)

Comparisons to USEPA saltwater acute quality criteria are summarized in Tables 10-17 and indicated that ammonia was the constituent in the Pensacola Inner Harbor sediment that had the greatest potential to be released into the water column at elevated concentrations during open water or ocean placement (Table 10). Based on acute (1.92 mg/L) ammonia criterion, ammonia exceeded the WQC by a factor of 10.9. The STFATE model took background concentration into account, readjusting the dilution to 10.7, and indicated that an 11-fold dilution within four hours after placement of sediment at the ODMDS would be required to meet the LPC (Table 19A).

Results of the water column bioassays are presented in Table 18. To determine water column toxicity, the water column bioassay for *M. galloprovincialis* had an EC₅₀ of 43.2 percent elutriate, and embryo development was significantly inhibited in the 100 percent elutriate. The LC₅₀ for the *A. bahia* and *M. beryllina* bioassays was greater than 100 percent elutriate. Therefore, a dilution of approximately 232-fold is required for the sediment from the Pensacola Inner Harbor Channel to achieve the LPC for water column toxicity for ocean placement at the Pensacola Offshore ODMDS (Table 18).

Results of STFATE modeling (assuming a 4,000 cy placement event) indicated that an 574-fold dilution would occur within 4-hours following placement at the Pensacola Offshore ODMDS, which would be sufficient to achieve the dilution required to meet the acute water quality criterion for ammonia. The STFATE model also indicated that 4-hours following placement, the leading edge of the plume was estimated to travel approximately 5,647 linear feet from the placement location, remaining well within the boundary of the Pensacola Offshore ODMDS.

To maximize the dredged material volume that could be placed at the Pensacola Offshore ODMDS during a single placement event and achieve compliance with the LPC for water

column toxicity, additional STFATE model scenarios were conducted. Results of the STFATE modeling indicated that placement events of up to 10,000 cy met the LPC for water column toxicity. Within 4 hours following placement, a dilution of 234-fold would be achieved and the leading edge of the sediment plume would travel 5,647 ft, remaining inside the ODMDS site boundary (Table 20A).

Benthic Toxicity

Survival in the whole sediment bioassays was not statistically different from the reference site for either *N. arenaceodentata* or *L. plumulosus* (Table 21). Therefore, sediment from Pensacola Inner Harbor Channel meets the LPC requirement for benthic toxicity.

Benthic Bioaccumulation

The results of the bioaccumulation testing are summarized in Table 22. None of the sediments from the Pensacola Inner Harbor Channel had a percent survival for *M. nasuta* that was statistically different than the reference sediment. None of the tested analytes in tissue samples from *N. virens* (worm) and *M. nasuta* (clam) exceeded the USFDA Action/Guidance/Tolerance Levels (Table 29). Results of the tissue residue analyses for tissues exposed to sediment from the Pensacola Inner Harbor are summarized in Tables 23-29. For *N. virens* and *M. nasuta*, lead and OCDD were the only constituents with mean concentrations that statistically exceeded the mean concentration at the reference site (Tables 23 and 24, respectively). The mean lead and OCDD concentrations did not statistically exceed the pre-test tissue, and the mean lead concentration was below the USEPA Region 4 background concentrations for the North Gulf of Mexico (USEPA/USACE-Region 4 SAD 2008). In addition, the dioxin TEQs did not exceed the dioxin TEQ at the reference site (Table 24). Therefore, there is little evidence of bioaccumulation of dioxin and furan congeners.

Based on the assessment of chemical analyses performed on tissues exposed to sediment from Pensacola Inner Harbor Channel and reference site sediment, it is anticipated that ocean placement of the dredged material from Pensacola Inner Harbor Channel at the Pensacola Offshore ODMDS is not expected to result in ecologically significant bioaccumulation of contaminants. Therefore, the dredged material from the Pensacola Inner Harbor Channel meets the LPC for benthic bioaccumulation, and complies with the benthic criteria of 40 CFR Part 227.13 (c) (3).

Sediments from Pensacola Inner Harbor Channel meet the criteria for the LPC for WQC, water column toxicity, benthic toxicity, and benthic bioaccumulation, indicating that ocean placement of the dredged material is a viable placement option. Based on the results of the STFATE modeling, placement of up to 10,000 cy per placement event complies with the LPC for WQC and water column toxicity.

b. Pensacola East Channel

Four individual sediment samples were tested for physical characteristics and two composite sediment samples were tested for physical, chemical, and ecotoxicological characteristics from Pensacola East Channel. The results from the sediment testing are summarized in Tables 1-9.

The sediments from the East Channel were comprised mostly of silt+clay, ranging from approximately 95 to 98 percent (Table 1).

A total of four constituents - two metals (arsenic and mercury) (Table 3), one PAH (Table 4), and total PCBs (Table 5) – were detected between the TEL and PEL values in at least one of the East Channel composites. None of the detected concentrations exceeded the PEL values. The dioxin TEQ in the East Channel sediment ranged from 12.6 to 20.1 ng/kg (Table 7).

Water Quality Criteria (WQC) (Elutriate Analysis) and Water Column Toxicity (Liquid and Suspended Phase Bioassays)

Comparisons to USEPA saltwater acute quality criteria are summarized in Tables 10-17 and indicated that ammonia was the constituent in the Pensacola East Channel sediment that had the greatest potential to be released into the water column at elevated concentrations during open water or ocean placement (Table 10). Based on acute (1.92 mg/L) ammonia criterion, ammonia exceeded the WQC by a factor of 8.3. The STFATE model took background concentration into account, readjusting the dilution to 7.9, and indicated that an 8-fold dilution within four hours after placement of sediment at the ODMDS would be required to meet the LPC (Table 19B).

Results of the water column bioassays are presented in Table 18. For the water column toxicity, the water column bioassay for *M. galloprovincialis* had an EC₅₀ of 86 percent elutriate, and embryo development embryo development was significantly inhibited in the 100 percent elutriate for both samples, and the LC₅₀ for the *A. bahia* and *M. beryllina* bioassays was greater than 100 percent elutriate . Therefore, a dilution of approximately 116-fold is required for the sediment from the Pensacola East Channel to achieve the LPC for water column toxicity for ocean placement at the Pensacola Offshore ODMDS (Table 18).

Results of STFATE modeling (assuming a 4,000 cy placement event) indicated that an 580-fold dilution would occur within 4-hours following placement at the Pensacola Offshore ODMDS, which would be sufficient to achieve the dilution required to meet the acute water quality criterion for ammonia. The STFATE model also indicated that 4-hours following placement, the leading edge of the plume was estimated to travel approximately 5,647 linear feet from the placement location, remaining well within the boundary of the Pensacola Offshore ODMDS.

To maximize the dredged material volume that could be placed at the Pensacola Offshore ODMDS during a single placement event and achieve compliance with the LPC for water column toxicity, additional STFATE model scenarios were conducted. Results of the STFATE modeling indicated that placement events of up to 31,000 cy met the LPC for water column toxicity. Within 4 hours following placement, a dilution of 120-fold would be achieved and the leading edge of the sediment plume would travel 5,647 ft, remaining inside the ODMDS site boundary (Table 19B).

Benthic Toxicity

Survival in the whole sediment bioassays was not statistically different from the reference site for either *N. arenaceodentata* or *L. plumulosus* (Table 21). Therefore, sediment from Pensacola East Channel meets the LPC requirement for benthic toxicity.

Benthic Bioaccumulation

The results of the bioaccumulation testing are summarized in Table 22. None of the sediments from the Pensacola East Channel had a percent survival for *M. nasuta* that was statistically different than the reference sediment. None of the tested analytes in tissue samples from *N. virens* (worm) and *M. nasuta* (clam) exceeded the USFDA Action/Guidance/Tolerance Levels (Table 29). Results of the tissue residue analysis are summarized in Tables 23-29. For *N. virens* and *M. nasuta*, copper and lead were the only constituents with mean concentrations that statistically exceeded the mean concentration at the reference site and statistically exceeded the pre-test tissue concentrations (Table 23). The mean copper and lead concentrations were within the range of the USEPA Region 4 background concentrations for the North Gulf of Mexico (USEPA/USACE-Region 4 SAD 2008).

Based on the assessment of chemical analyses performed on tissues exposed to sediment from Pensacola East Channel and reference site sediment, it is anticipated that ocean placement of the dredged material from Pensacola East Channel at the Pensacola Offshore ODMDS is not expected to result in ecologically significant bioaccumulation of contaminants. Therefore, the dredged material from the Pensacola East Channel meets the LPC for benthic bioaccumulation, and complies with the benthic criteria of 40 CFR Part 227.13 (c) (3).

Sediments from Pensacola East Channel meet the criteria for the LPC for WQC, water column toxicity, benthic toxicity, and benthic bioaccumulation, indicating that ocean placement of the dredged material is a viable placement option. Based on the results of the STFATE modeling, placement of up to 31,000 cy per placement event complies with the LPC for WQC and water column toxicity.

c. Pensacola Bay Channel

Four individual sediment samples were tested for physical characteristics and two composite sediment samples were tested for physical, chemical, and ecotoxicological characteristics from Pensacola Bay Channel. The results from the sediment testing are summarized in Tables 1-9. The sediments from the Bay Channel were comprised mostly of silt+clay, ranging from approximately 88 to 96 percent (Table 1).

A total of two constituents - one metal (arsenic) and total PCBs (Tables 3 and 5, respectively) – were detected between the TEL and PEL values. None of the detected concentrations exceeded the PEL values. The dioxin TEQ in the Bay Channel sediment ranged from 10.9 to 15.3 ng/kg (Table 7).

Water Quality Criteria (WQC) (Elutriate Analysis) and Water Column Toxicity (Liquid and Suspended Phase Bioassays)

Comparisons to USEPA saltwater acute criteria are presented in Tables 10-17 and indicated that ammonia was the constituent in the Pensacola Bay Channel sediment that had the greatest potential to be released into the water column at elevated concentrations during open water or ocean placement (Table 10). Based on the acute (1.92 mg/L) ammonia criterion, ammonia exceeded the WQC by a factor of 6.8. The STFATE model took background concentration into

account, readjusting the dilution to 6.2, and indicated that a 7-fold dilution within four hours after placement of sediment at the ODMDS would be required to meet the LPC (Table 19C).

Results of the water column bioassays are presented in Table 18. For the water column toxicity, the water column bioassay for *M. galloprovincialis* had an EC₅₀ of greater than percent elutriate, but embryo development embryo development was significantly inhibited in the 100 percent elutriate, and the LC₅₀ for the *A. bahia* and *M. beryllina* bioassays was greater than 100 percent elutriate. Therefore, a dilution of approximately 100-fold is required for the sediment from the Pensacola Bay Channel to achieve the LPC for water column toxicity for ocean placement at the Pensacola Offshore ODMDS (Table 18).

Results of STFATE modeling (assuming a 4,000 cy placement event) indicated that an 598-fold dilution would occur within 4-hours following placement at the Pensacola Offshore ODMDS, which would be sufficient to achieve the dilution required to meet the acute water quality criterion for ammonia. The STFATE model also indicated that 4-hours following placement, the leading edge of the plume was estimated to travel approximately 5,647 linear feet from the placement location, remaining well within the boundary of the Pensacola Offshore ODMDS.

To maximize the dredged material volume that could be placed at the Pensacola Offshore ODMDS during a single placement event and achieve compliance with the LPC for water column toxicity, additional STFATE model scenarios were conducted. Results of the STFATE modeling indicated that placement events of up to 40,000 cy met the LPC for water column toxicity. Within 4 hours following placement, a dilution of 120-fold would be achieved and the leading edge of the sediment plume would travel 5,647 ft, remaining inside the ODMDS site boundary (Table 19C).

Benthic Toxicity

For *L. plumulosus* one sample (PEN12-09/10) exhibited a percent survival that was statistically different than the survival in the reference site sediments. The *L. plumulosus* survival at PEN12-09/10 was not greater than 20 percent different than the survival at the reference site; therefore, sediment from Pensacola Bay Channel meets the LPC requirement for benthic toxicity (Table 21).

Benthic Bioaccumulation

The results of the bioaccumulation testing are summarized in Table 22. None of the sediments from the Pensacola Bay Channel had a percent survival for *M. nasuta* that was statistically different than the reference sediment. None of the tested analytes in tissue samples from *N. virens* (worm) and *M. nasuta* (clam) exceeded the USFDA Action/Guidance/Tolerance Levels (Table 29). For *N. virens* and *M. nasuta*, lead was the only constituent with a mean concentration that statistically exceeded the mean concentration at the reference site (Table 23). The mean lead concentration did not statistically exceed the pre-test tissue concentrations and was below the range of the USEPA Region 4 background concentrations for the North Gulf of Mexico (USEPA/USACE-Region 4 SAD 2008).

Based on the assessment of chemical analyses performed on tissues exposed to sediment from Pensacola Bay Channel and reference site sediment, it is anticipated that ocean placement of the

dredged material from Pensacola Bay Channel at the Pensacola Offshore ODMDS is not expected to result in ecologically significant bioaccumulation of contaminants. Therefore, the dredged material from the Pensacola Bay Channel meets the LPC for benthic bioaccumulation, and complies with the benthic criteria of 40 CFR Part 227.13 (c) (3).

Sediments from Pensacola Bay Channel meet the criteria for the LPC for WQC, water column toxicity, benthic toxicity, and benthic bioaccumulation, indicating that ocean placement of the dredged material is a viable placement option. Based on the results of the STFATE modeling, placement of up to 40,000 cy per placement event complies with the LPC for WQC and water column toxicity.

7. NON-TESTING RELATED REGULATORY ISSUES: SUBPARTS B, C, D, and E of 40 CFR PART 227

a. Compliance with 40 CFR Part 227 Subpart B – Environmental Impact. The following criteria were evaluated to determine that the proposed dredged material placement would not degrade the marine environment, and that the dredged material placement would not produce an unacceptable adverse effect on human health or on the ocean for other future uses.

- i. **40 CFR Part 227.4 Criteria for Evaluating Environmental Impact.** The material to be dredged from project area does not contain any of the prohibited materials listed in 40 CFR Part 227.5 including radioactive waste, material used in radiological, chemical or biological warfare, or persistent inert synthetic or natural materials that may float and thus interfere with legitimate uses of the ocean. In addition, the material has been sufficiently described to make this determination.
- ii. **40 CFR Part 227.5 Prohibited Materials.** The material does not contain any of the constituents prohibited as other than trace contaminants listed in 40 CFR Part 227.6 including organohalogen compounds, mercury and mercury compounds, cadmium and cadmium compounds, oil, or known carcinogens, mutagens, or teratogens.
- iii. **40 CFR Part 227.7 Limits Established for Specific Wastes or Waste Constituents.** The material to be disposed in the Pensacola Offshore ODMDS is composed of naturally occurring sediment to be dredged from waters of the U.S. and does not meet the definition of those materials listed in 40 CFR Part 227.7, which includes pathogens, biological pests, and non-indigenous species.
- iv. **40 CFR Parts 227.8, 227.11, and 227.12 Limitations on the Disposal Rates of Toxic Wastes, Containerized Wastes, and Insoluble Wastes.** The material does not contain toxic waste as regulated under 40 CFR Part 227.8. The material proposed for disposal at the Pensacola Offshore ODMDS is not required to be containerized as described in 40 CFR Part 227.11. The dredged material does not contain any inert synthetic or natural material that may float or remain in suspension. Dredged material is natural sediment dredged from the waterways of the U.S. and is not considered to be solid waste as described in 40 CFR Part 227.12.

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- v. **40 CFR Part 227.9 Limitations on Quantities of Waste Materials.** Although large quantities of dredged material are proposed for placement at the Pensacola Offshore ODMDS, the site was designated with these quantities in mind and was located in an area and sized such that unacceptable impacts would not occur as described in 40 CFR Part 227.9.
 - vi. **40 CFR Part 227.10 Hazards to Fishing, Navigation, Shorelines, or Beaches.** The designation of the Pensacola Offshore ODMDS took into account possible hazards to fishing, navigation, shorelines, and beaches. The material proposed for disposal at the Pensacola Offshore ODMDS will be placed in such a manner as to not result in adverse impacts to the fishing, shorelines, or beaches and as not to interfere with coastal navigation as described in 40 CFR Part 227.10.

Appropriate testing has been performed and is described in earlier sections of this Section 103 Evaluation. The material has been determined to be in compliance with the requirements of 40 CFR Part 227.6 and there would be no violation of marine water quality criteria after the allowance for mixing. Bioassays on the suspended particulate phase (elutriate) the solid phase (whole sediment bioassay) show that the material can be discharged so not to exceed the LPC as described in paragraph (b) of 40 CFR Part 227.27.

b. Compliance with 40 CFR Part 227 Subpart C – Need for Ocean Disposal. The proposed maintenance dredging, transport, and placement in the Pensacola Offshore ODMDS is covered in the Final Environmental Impact Statement for Designation of a New Ocean Dredged Material Disposal Site, Pensacola, Florida (USEPA 1998). In accordance with at 40 CFR Part 227.16, USACE-Mobile District has demonstrated a need for ocean placement by conducting a thorough evaluation of the factors listed in Part 227.15 and there are no practicable improvements which can be made to reduce the adverse impacts on the environment, and there are no practicable alternative locations and methods of placement or recycling available which have less adverse environmental impact or potential risk to other parts of the environment than ocean placement.

c. Compliance with 40 CFR Part 227 Subpart D – Impact of the Proposed Dumping on Aesthetic, Recreational, and Economic Values. The following factors have been considered in making the determination that the proposed placement will not impact aesthetic, recreational or economic values of the Gulf of Mexico in the vicinity of the Pensacola Offshore ODMDS:

- 1) The area has been used in the past for the disposal of dredged material and has not resulted in negative impacts to potential recreational or commercial activities. The mound configurations proposed for similar placement activities benefit fish by creating structure in an otherwise flat sea bottom.
- 2) Based on past use of the area and the characteristics of the material proposed for placement, no impact to water quality is to be expected. The material will be discharged from bottom dump scows with the initial point of discharge approximately 25 ft below the surface of the water. Based on results of the STFATE model, no applicable water quality standards will be violated by the proposed activity.

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- 3) The material proposed for placement contains substantial quantities of silt and clay. The point of initial discharge is below the surface of the water and because the material is somewhat consolidated, the majority of the material will be entrained into the placement surge, which is in a downward direction because of gravity. The STFATE modeling shows that any turbidity caused by placement is restricted to the immediate vicinity of the hopper dredge or dump scow and persists for only a short period of time, quickly dissipating to background concentrations.
 - 4) Pathogenic organisms are not expected to be present in the material. However, if present they would likely be fecal coliforms that are killed by saline waters and would not pose any impact to fisheries. No shellfisheries are located in the vicinity of the Pensacola Offshore ODMDS.
 - 5) No toxic chemical constituents are present in the dredged material in concentrations suspected of affecting humans either directly or indirectly through the food chain. This investigation has not identified any constituents within the dredged material that would be expected to impact living marine resources.

d. Compliance with 40 CFR Part 227 Subpart E – Impact of the Proposed Dumping on Other Uses of the Ocean. The proposed placement of dredged material in the Pensacola Offshore ODMDS would have no long term impact on any other uses of the ocean including, but not limited to, commercial and recreational fishing, commercial and recreational navigation, mineral exploration or development, or scientific research. Short-term impacts may occur because of the presence of the tugs and scows in the Pensacola Offshore ODMDS, however this is short term and all users of the ocean would continue to have access to the area between disposal events. No irreversible or irretrievable commitment of resources would result from the proposed discharge.

8. MPRSA SECTION 103 CONDITIONS

a. Requirements to Meet Ocean Disposal Criteria. No special requirements are required to meet the ocean disposal criteria. Dredged material placement at the Pensacola Offshore ODMDS will occur at least 330 ft (100 m) inside the boundary of the site, and placement methods shall prevent mounding from becoming an unacceptable navigation hazard to comply with 40 CFR Section 227.28. Future placement of material at the Pensacola Offshore ODMDS will undergo the same requirements as per USACE/USEPA guidelines for ocean placement (USACE/USEPA 1991; USACE-South Atlantic Division/USEPA Region 4 2008). Future testing will be performed as specified by USEPA-Region 4.

b. Requirements of Site Designation Conditions. A placement zone within the Pensacola Offshore ODMDS will be designated for the Pensacola Harbor Channel new work dredged material placement by USEPA Region 4 and USACE-Mobile District. Placement will distribute the dredged material across the placement zone to prevent mounding that could result in a navigation hazard. Bathymetric surveys may be performed as warranted should concerns be raised concerning the placement of dredged material. Placement shall occur no less than 330 feet (100 meters) inside the site boundaries such that the material. The actual location of placement

within the Pensacola Offshore ODMDS will be determined in coordination with USEPA Region 4 prior to the start of dredging.

Due to the predominant western current in the area, the site is considered to be dispersive for the less dense disposed material. The horseshoe-shaped, submerged berm structure was constructed to be open on the western end, with fine-grained material placed in the eastern midsection of the horseshoe to reduce dispersion and possible associated adverse impacts (USEPA/USACE 2005).

c. Requirements of the Site Monitoring and Management Plan (SMPM). Dredged material shall be placed so that at no point will depths be less than -55 ft MLLW (ie, a clearance of 55 feet above the bottom will be maintained), where a depth of -60 ft MLLW is the warning threshold for monitoring and management purposes. If -60 ft MLLW is reached, then management decisions will be made on future sediment placement to avoid exceeding the -55 foot MLLW threshold. Water depths at the time of placement will be monitored to detect if adjustments of placement methods are needed to prevent unacceptable mounding. The physical removal or leveling of material deposited above -55 feet MLLW may be considered should mound heights occur that are higher than those elevations.

Dredged material placement shall be limited within the designated release zone and shall be completed (doors closed) prior to departing the Pensacola Offshore ODMDS.

No restrictions have been determined to be necessary for dredged material placement related to seasonal variations in ocean currents of biological activity (USEPA/USACE 2005).

No specific placement techniques are required for this site, however, to protect sea turtles and Gulf sturgeon, National Marine Fisheries Service (NMFS) requires monitoring according to the *Regional Biological Opinion for Dredging of Gulf of Mexico Navigation Channels and Sand Mining (“Borrow”) Area Using Hopper Dredged by Corps Galveston, New Orleans, Mobile, and Jacksonville Districts* (NMFS 2003). In addition, standard surveillance and evasive measures to protect sea turtle and marine mammals shall be employed during all placement operations at the ODMDS (USEPA 2005).

Hopper dredges and/or split hull dump scows will be used to transport the material to the offshore disposal site and they will be equipped with Automated Scow Monitoring Systems in compliance with the USACE National Dredging Quality Management (DQM) System requirements. These systems collect, store, and transmit barge draft, location in transit, and verification data for offshore material placement. The (DQM) System will be operated to continuously track in real-time the horizontal location and draft condition (nearest 0.5 foot) of the placement vessel (i.e. hopper dredge or disposal scow) from the point of dredging to the disposal site, and return to the point of dredging. Data shall be collected at least every 500 feet during travel to and from the ODMDS and every minute or every 200 feet of travel, whichever is smaller, while approaching within 1,000 feet of the boundary of the ODMDS. This information will be available daily and will be transmitted to USACE and USEPA (per DQM requirements), and/or the dredging contractor's management team, and these data will serve as quality assurance (QA) and quality control (QC) for the offshore placement activities.

A bathymetric survey will be completed within 60 days after disposal project completion. The number and length of transects required will be sufficient to encompass the placement areas within the Pensacola Offshore ODMDS and a 500-foot wide area around the site. The survey area may be reduced on a case-by-case basis if placement zones are specified and adhered to. The surveys will be taken along lines spaced at 500-foot intervals or less. Bathymetric surveys will be used to monitor the disposal mound to ensure a navigation hazard is not produced, and to assist in verification of material placement, to monitor bathymetric changes and trends, to aid in environmental effects monitoring, and to ensure that the site capacity is not exceeded. Results of the bathymetric survey will be provided to USEPA Region 4 when completed.

It is expected that dredged material placement monitoring data will be provided to USEPA Region 4 electronically on a weekly basis, and a placement summary report will be provided to USEPA Region 4 within 90 days after project completion. Specific reporting requirements are detailed in the Pensacola Offshore ODMDS SMMP (USEPA/USACE 2005).

The USACE-Mobile District plans to incorporate contract specifications that are prescribed in the final SMMP into the dredging contract(s) for the proposed work. Final contract specifications for the proposed new work will be written after final designs have been completed.

9. REFERENCES

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TABLE 1. PHYSICAL CHARACTERISTICS OF SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)

ANALYTE	UNITS	Reference Site	Pensacola Inner Harbor						Pensacola East Channel						Pensacola Bay Channel						
			PEN12-01	PEN12-02	PEN12-01/02	PEN12-03	PEN12-04	PEN12-03/04	PEN12-05	PEN12-06	PEN12-05/06	PEN12-07	PEN12-08	PEN12-07/08	PEN12-09	PEN12-10	PEN12-09/10	PEN12-11	PEN12-12	PEN12-11/12	
GRAVEL	%	MOBILE SITE C	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SAND	%		79.1	33.1	5.7	6.2	1.3	3.6	1.2	9.2	2.5	4.4	2.6	3.6	4.7	10.7	4.6	6.7	4.2	12.2	5.3
SILT	%		8.8	30.1	55.2	54.2	65	48.5	56.5	41.5	52.6	48.9	58.4	47.9	43.3	47.2	62.2	58.9	58.9	57.8	62
CLAY	%		11.3	36.1	39.1	39.6	33.7	47.9	42.3	49.3	44.9	46.7	39	48.5	52	42.1	33.2	34.4	36.9	30	32.7
SILT+CLAY	%		20.1	66.2	94.3	93.8	98.7	96.4	98.8	90.8	97.5	95.6	97.4	96.4	95.3	89.3	95.4	93.3	95.8	87.8	94.7
LIQUID LIMIT	--		0	50	203	190	205	149	189	195	188	191	174	153	157	161	161	154	161	141	156
PLASTIC LIMIT	--		0	18	60	59	67	47	64	65	69	68	63	57	60	54	61	59	60	53	58
PLASTICITY INDEX	--		NP	32	143	131	139	102	124	129	119	123	111	95	96	108	101	95	101	89	98
SPECIFIC GRAVITY	--		2.7	2.66	2.65	2.67	2.64	2.64	2.66	2.68	2.68	2.68	2.69	2.69	2.7	2.71	2.7	2.69	2.69	2.7	2.7
Soil Classification	--	SM	CH	CH	CH	CH	CH	CH	CH	MH	MH	MH	MH	MH	CH	MH	CH	CH	CH	CH	
		SILTY SAND	HIGH PLASTICITY CLAY						HIGH PLASTICITY CLAY	HIGH PLASTICITY SILT					HIGH PLASTICITY CLAY	HIGH PLASTICITY SILT	HIGH PLASTICITY CLAY				

CH = high plasticity clay

MH = high plasticity silt

NP = no plasticity

SM = silty sand

SP = poorly graded sand

**TABLE 2. GENERAL CHEMISTRY CONCENTRATIONS (MG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	Reference Site	Pensacola Inner Harbor		Pensacola East Channel		Pensacola Bay Channel	
			MOBILE SITE C	PEN12-01/02	PEN12-03/04	PEN12-05/06	PEN12-07/08	PEN12-09/10	PEN12-11/12
CYANIDE	MG/KG	0.70	0.36 U	0.99 U	1 U	0.89 U	0.76 U	0.52 U	0.42 J
NITROGEN, AMMONIA	MG/KG	13.7	6.5 J	410	420	300	140	88	180
NITROGEN, NITRATE	MG/KG	1.41	0.74 U	0.39 J	2 U	1 J	1.7	0.2 J	0.93 J
NITROGEN, NITRITE	MG/KG	1.41	0.74 U	2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
NITROGEN, TOTAL KJELDAHL	MG/KG	408	610 B	3,500 B	3,400 B	3,000 B	2,300 B	1,700 B	2,600 B
PHOSPHORUS, TOTAL	MG/KG	78.4	130	540	380	560	22 J	190	420
SULFIDE, TOTAL	MG/KG	63.8	10 J	200	200	160	11 J	28 J	12 J
TOTAL ORGANIC CARBON	%	0.285	0.7	4.4	4.2	4	3.2	2.2	3.3

There are no sediment quality guidelines for the general chemistry parameters

NOTES: Bold values represent detected concentrations; RL is reported for non-detected constituents.

RL = average reporting limit

B = detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed but not detected

**TABLE 3. METAL CONCENTRATIONS (MG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average			Reference Site	Pensacola Inner Harbor		Pensacola East Channel		Pensacola Bay Channel	
		RL	TEL*	PEL*	MOBILE SITE C	PEN12-01/02	PEN12-03/04	PEN12-05/06	PEN12-07/08	PEN12-09/10	PEN12-11/12
ALUMINUM	MG/KG	3.9	--	--	2,700	25,000	24,000	22,000	20,000	13,000	19,000
ANTIMONY	MG/KG	0.26	--	--	0.032 J	0.19 J	0.14 J	0.16 J	0.11 J	0.073 J	0.12 J
ARSENIC	MG/KG	0.13	7.24	41.6	4.3	20	18	17	14	10	20
BERYLLIUM	MG/KG	0.13			0.22	1.7	1.5	1.4	1.6	0.95	1.3
CADMIUM	MG/KG	0.24	0.676	4.21	0.027 J	0.52	0.43	0.41	0.32	0.2	0.32
CHROMIUM	MG/KG	0.26	52.3	160	7.3 B	59 B	53 B	52 B	50 B	33 B	49 B
COPPER	MG/KG	1.01	18.7	108	1.1	14	11	16	11	1.7	14
IRON	MG/KG	6.4	--	--	5,700	37,000	33,000	33,000	32,000	19,000	29,000
LEAD	MG/KG	0.28	30.2	112	2.6	42	38	29	16	13	18
MERCURY	MG/KG	0.05	0.13	0.696	0.012 J	0.22	0.23	0.14	0.072	0.044	0.087
NICKEL	MG/KG	1.48	15.9	42.8	1.1 J B	17	15	14	15	3.3 B	15
SELENIUM	MG/KG	0.64	--	--	0.27 J	1.9	1.8	1.9	1.4	1.1	1.6
SILVER	MG/KG	0.13	0.73	1.77	0.016 J	0.33	0.28	0.26	0.11 J	0.078 J	0.15
THALLIUM	MG/KG	0.13	--	--	0.07 B	0.25 B	0.23 B	0.24 B	0.21 B	0.15 B	0.22 B
ZINC	MG/KG	3.85	124	271	11 B	110 B	62	47	36	20	35
SEM/AVS	--	0.001	--	--	0.67	0.26	0.22	1.1	2.2	0.46	2

*Source : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents.

RL = average reporting limit

B = detected in the laboratory method blank

TEL = threshold effects level

J = compound was detected, but below the reporting limit (value is estimated)

PEL = probable effects level

U = compound was analyzed but not detected

**TABLE 4. PAH CONCENTRATIONS (UG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	TEL*	PEL*	Reference Site	Pensacola Inner Harbor		Pensacola East Channel		Pensacola Bay Channel	
					MOBILE SITE C	PEN12-01/02	PEN12-03/04	PEN12-05/06	PEN12-07/08	PEN12-09/10	PEN12-11/12
					Low Molecular Weight PAHs (LPAHs)						
1-METHYLNAPHTHALENE	UG/KG	44	--	--	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
2-METHYLNAPHTHALENE	UG/KG	44	20.2	201	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
ACENAPHTHENE	UG/KG	44	6.71	88.9	9.8 U	13 J	13 J	60 U	51 U	34 U	54 U
ANTHRACENE	UG/KG	44	46.9	245	9.8 U	46 J	38 J	12 J	6.6 J	34 U	54 U
FLUORENE	UG/KG	44	21.2	144	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
NAPHTHALENE	UG/KG	44	34.6	391	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
PHENANTHRENE	UG/KG	44	86.7	544	9.8 U	78	74	35 J	18 J	34 U	54 U
TOTAL LPAHS ^(a) (ND=RL)	UG/KG	--	1,684	16,770	34.3	486	470	420	357	238	378
High Molecular Weight PAHs (HPAHs)											
BENZO(A)ANTHRACENE	UG/KG	44	74.8	693	9.8 U	180	150	46 J	25 J	8.3 J	54 U
BENZO(A)PYRENE	UG/KG	44	88.8	763	9.8 U	220	190	59 J	27 J	9 J	54 U
CHRYSENE	UG/KG	44	108	846	9.8 U	180	150	58 J	23 J	8.3 J	54 U
DIBENZO(A,H)ANTHRACENE	UG/KG	44	6.22	135	9.8 U	37 J	35 J	18 J	51 U	34 U	54 U
FLUORANTHENE	UG/KG	44	113	1,494	9.8 U	200	200	69	34 J	11 J	54 U
PYRENE	UG/KG	44	153	1,398	9.8 U	260	230	75	36 J	11 J	54 U
TOTAL HPAHS ^(a) (ND=RL)	UG/KG	--	1,684	16,770	29.4	1,108	986	384	306	204	324
Other Polycyclic Aromatic Hydrocarbons (PAHs)											
ACENAPHTHYLENE	UG/KG	44	5.87	128	9.8 U	68	48 J	60 U	51 U	34 U	54 U
BENZO(B)FLUORANTHENE	UG/KG	44	--	--	9.8 U	240	220	63	26 J	7.9 J	54 U
BENZO(G,H,I)PERYLENE	UG/KG	44	--	--	9.8 U	160	150	51 J	21 J	7.3 J	54 U
BENZO(K)FLUORANTHENE	UG/KG	44	--	--	9.8 U	130	95	31 J	16 J	34 U	54 U
INDENO(1,2,3-CD)PYRENE	UG/KG	44	--	--	9.8 U	130	110	43 J	17 J	6.5 J	54 U
TOTAL PAHS ^(b) (ND=RL)	UG/KG	--	1,684	16,770	88.2	2,322	2,097	1,107	918	612	972

*Source : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents.

(a) Low molecular weight and high molecular weight PAHs, as per SERIM Table 5-5 (USACE/USEPA 2008)

(b) Total PAHs is a sum of each individual PAH, NOT the sum of the LPAHs and HPAHs

RL = average reporting limit

J = compound was detected, but below the reporting limit (value is estimated)

TEL = threshold effects level

U = compound was analyzed, but not detected

PEL = probable effects level

TABLE 5. PCB CONGENER CONCENTRATIONS (UG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)

ANALYTE	UNITS	Average			Reference Site
		RL	TEL**	PEL**	
PCB 8 (BZ) *†	UG/KG	1.41	--	--	0.72 J P
PCB 18 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 28 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 44 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 49 (BZ) *	UG/KG	1.41	--	--	0.74 U
PCB 52 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 66 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 77 (BZ) *	UG/KG	1.41	--	--	0.74 U
PCB 87 (BZ)*	UG/KG	1.41	--	--	0.74 U
PCB 101 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 105 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 118 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 126 (BZ) *	UG/KG	1.41	--	--	0.74 U
PCB 128 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 138 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 153 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 156 (BZ) *	UG/KG	1.41	--	--	0.74 U
PCB 169 (BZ) *	UG/KG	1.41	--	--	0.74 U
PCB 170 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 180 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 183 (BZ) *	UG/KG	1.41	--	--	0.74 U
PCB 184 (BZ) *	UG/KG	1.41	--	--	0.74 U
PCB 187 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 195 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 206 (BZ) *†	UG/KG	1.41	--	--	0.74 U
PCB 209 (BZ) *†	UG/KG	1.41	--	--	0.74 U
Total USEPA-Region 4 PCBs	UG/KG	--	21.6	189	19.2
Total USEPA-NOAA PCBs	UG/KG	--	21.6	189	13.3

		Pensacola Inner Harbor		Pensacola East Channel		Pensacola Bay Channel	
		PEN12-01/02	PEN12-03/04	PEN12-05/06	PEN12-07/08	PEN12-09/10	PEN12-11/12
		2 U	1.4 J P	1.2 J P	0.93 J P	1 U	1.9 P
		1.2 J	1.6 J	0.66 J P	1.5 U	1 U	0.42 J P
		1.1 J P	1.4 J P	0.44 J P	1.5 U	1 U	1.6 U
		0.55 J	0.84 J	1.8 U	1.5 U	1 U	1.6 U
		2.2	2.5	2	0.47 J	0.37 J	1.6 U
		2.8	1.7 J	1.5 J	1.5 U	0.76 J P	1.1 J P
		2.9	1.3 J P	0.89 J P	1.5 U	1 U	1.6 U
		3.3 P	4.3 P	2.6 P	0.79 J P	0.27 J P	0.53 J P
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		1.3 J P	1.7 J P	1.2 J P	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		0.69 J P	0.97 J P	0.75 J P	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		2 U	0.46 J	1.8 U	1.5 U	1 U	1.6 U
		1.2 J P	1.3 J P	1.8 U	1.5 U	0.38 J P	0.54 J
		2.7	2.9	1.9 P	0.54 J	0.53 J	1.1 J
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		0.73 J	0.62 J	1.8 U	1.5 U	1 U	1.6 U
		0.42 J P	0.46 J P	1.8 U	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		2 U	2 U	1.8 U	1.5 U	1 U	1.6 U
		109	107	94	78	26	83.2
		76.8	73.8	64.8	54	18	57.6

* PCB congeners used for the Total USEPA-Region 4 PCB summation, as per Table 5-6 of the SERIM (USEPA/USACE 2008)

† PCB congeners used for the Total USEPA-NOAA PCB summation, as per Table 5-6 of the SERIM (USEPA/USACE 2008)

**Source : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents.

RL = average reporting limit

TEL = threshold effects level

PEL = probable effects level

**TABLE 6. CHLORINATED PESTICIDE CONCENTRATIONS (UG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average			Reference Site
		RL	TEL*	PEL*	
		MOBILE SITE C			
4,4'-DDD	UG/KG	4.60	1.22	8	2 U
4,4'-DDE	UG/KG	4.60	2.07	374.17	2 U
4,4'-DDT	UG/KG	4.60	1.19	4.77	2 U
ALDRIN	UG/KG	4.60	--	--	2 U
ALPHA-BHC	UG/KG	4.60	--	--	2 U
BETA-BHC	UG/KG	4.60	--	--	2 U
CHLORDANE	UG/KG	46.00	2.26	4.79	20 U
CHLOROBENZIDE	UG/KG	4.60	--	--	2 U
DACHTAL	UG/KG	4.60	--	--	2 U
DELTA-BHC	UG/KG	4.60	--	--	2 U
DIELDRIN	UG/KG	4.60	0.715	4.3	2 U
ENDOSULFAN-I	UG/KG	4.60	--	--	2 U
ENDOSULFAN-II	UG/KG	4.60	--	--	2 U
ENDOSULFAN SULFATE	UG/KG	4.60	--	--	2 U
ENDRIN	UG/KG	4.60	--	--	2 U
ENDRIN ALDEHYDE	UG/KG	4.60	--	--	2 U
GAMMA-BHC (LINDANE)	UG/KG	4.60	0.32	0.99	2 U
HEPTACHLOR	UG/KG	4.60	--	--	2 U
HEPTACHLOR EPOXIDE	UG/KG	4.60	--	2.74	2 U
METHOXYCHLOR	UG/KG	9.26	--	--	3.9 U
MIREX	UG/KG	4.60	--	--	2 U
TOXAPHENE	UG/KG	183.25	--	--	78 U

*Source: MacDonald et al 1996. Ecotoxicology 5: 253-278

**Source : CCME 2001 Canadian Sediment Quality Guidelines for the Protection of Aquatic Life

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents.

RL = average reporting limit

TEL = threshold effects level

PEL = probable effects level

J = compound was detected, but below the reporting limit (value is estimated)

P = the percent difference between the original and confirmation analysis is greater than 40%

U^{\equiv} compound was analyzed, but not detected.

**TABLE 7. DIOXIN AND FURAN CONGENER CONCENTRATIONS (NG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average		Reference Site MOBILE SITE C	Pensacola Inner Harbor PEN12-01/02	Pensacola East Channel PEN12-05/06	Pensacola Bay Channel PEN12-09/10	Pensacola Bay Channel PEN12-11/12
		RL	TEF*					
2,3,7,8-TCDD	NG/KG	1.3	1	0.98 U	0.74 J	0.8 J	1.6 U	0.29 J
1,2,3,7,8-PECDD	NG/KG	6.7	1	4.9 U	3.6 B J	4.2 B J	2.4 B J	2 B J
1,2,3,4,7,8-HXCDD	NG/KG	6.7	0.1	1 Q J	7.7 B	8.7 B J	5.1 B J	4 B J
1,2,3,6,7,8-HXCDD	NG/KG	6.7	0.1	1.7 J	24 B	31 B	13 B	11 B
1,2,3,7,8,9-HXCDD	NG/KG	6.7	0.1	4.9	47 B	93 B	29 B	24 B
1,2,3,4,6,7,8-HPCDD	NG/KG	6.7	0.01	68	690 B	1100 B	420 B	320 B
OCDD	NG/KG	13.5	0.0003	1,400 B	7,200 B	11,000 B	4,600 B	3,400 B
2,3,7,8-TCDF	NG/KG	1.3	0.1	0.051 Q J	19 B	4.8 B	2.5 Q B	1.9 B
1,2,3,7,8-PECDF	NG/KG	6.7	0.03	4.9 U	5.6 J	2.8 J	0.95 J	0.66 Q J
2,3,4,7,8-PECDF	NG/KG	6.7	0.3	4.9 U	4.3 J	2.1 J	1.1 J	0.79 Q J
1,2,3,4,7,8-HXCDF	NG/KG	6.7	0.1	0.42 J	6.7 J	6.2 J	2.2 J	1.7 J
1,2,3,6,7,8-HXCDF	NG/KG	6.7	0.1	0.2 Q J	4.9 Q B J	4.5 Q B J	1.6 B J	1.3 B J
2,3,4,6,7,8-HXCDF	NG/KG	6.7	0.1	4.9 U	2.7 B J	2.8 B J	1.2 B J	1 Q B J
1,2,3,7,8,9-HXCDF	NG/KG	6.7	0.1	4.9 U	0.75 Q B J	0.75 B J	0.24 Q B J	0.2 Q B J
1,2,3,4,6,7,8-HPCDF	NG/KG	6.7	0.01	1.8 Q B J	52 B	61 B	19 B	16 Q B
1,2,3,4,7,8,9-HPCDF	NG/KG	6.7	0.01	4.9 U	5.6 B J	6.1 B J	1 Q B J	1.1 B J
OCDF	NG/KG	13.5	0.0003	3.1 Q B J	140 B	160 B	26 B	19 B
DIOXIN TEQ (ND=RL)	NG/KG	--	--	10.3	26.2	35.5	15.3	10.9

*Source : Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. *Toxicological Sciences* 93(2):223-241.

There are no sediment quality guidelines for dioxins and furans

NOTES: Bold values represent detected concentrations; RL is reported for non-detected constituents.

RL = average reporting limit

TEF = toxicity equivalency factor

TEQ = toxicity equivalency quotient

B = detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

Q = estimated maximum possible concentration (EMPC)

U = compound was analyzed, but not detected

TABLE 8. SEMIVOLATILE ORGANIC COMPOUND (SVOC) CONCENTRATIONS (UG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)

ANALYTE	UNITS	Average			Reference Site	Pensacola Inner Harbor		Pensacola East Channel		Pensacola Bay Channel	
		RL	TEL*	PEL*		PEN12-01/02	PEN12-03/04	PEN12-05/06	PEN12-07/08	PEN12-09/10	PEN12-11/12
1,2,4-TRICHLOROBENZENE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
1,2-DICHLOROBENZENE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
1,2-DIPHENYLHYDRAZINE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
1,3-DICHLOROBENZENE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
1,4-DICHLOROBENZENE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
2,2'-OXYBIS[1-CHLOROPROPANE]	UG/KG	44			9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
2,4,6-TRICHLOROPHENOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
2,4-DICHLOROPHENOL	UG/KG	44	--	--	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
2,4-DIMETHYLPHENOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
2,4-DINITROPHENOL	UG/KG	1116	--	--	250 U	1700 U	1700 U	1500 U	1300 U	870 U	1400 U
2,4-DINITROTOLUENE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
2,6-DINITROTOLUENE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
2-CHLORONAPHTHALENE	UG/KG	44	--		9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
2-CHLOROPHENOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
2-METHYLPHENOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
2-NITROPHENOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
3,3'-DICHLOROBENZIDINE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1116			250 U	1700 U	1700 U	1500 U	1300 U	870 U	1400 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
4-CHLORO-3-METHYL PHENOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
4-NITROPHENOL	UG/KG	1116	--	--	250 U	1700 U	1700 U	1500 U	1300 U	870 U	1400 U
BENZIDINE	UG/KG	4391	--	--	980 U	6800 U	6600 U	6000 U	5100 U	3400 U	5400 U
BENZOIC ACID	UG/KG	1116	--	--	250 U	1700 U	1700 U	1500 U	1300 U	870 U	1400 U
BENZYL ALCOHOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
BIS(2-CHLOROETHoxy)METHANE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	44	--	--	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
BIS(2-ETHYLHEXYL) PHTHALATE	UG/KG	437	182.16	2,647	98 U	60 J	53 J	600 U	510 U	340 U	530 U
BUTYL BENZYL PHTHALATE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
DIBENZOFURAN	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
DIETHYL PHTHALATE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
DIMETHYL PHTHALATE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
DI-N-BUTYL PHTHALATE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
DI-N-OCTYL PHTHALATE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
HEXAChLOROBENZENE	UG/KG	44	--	--	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
HEXAChLOROBUTADIENE	UG/KG	44	--	--	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
HEXAChLOROCYCLOPENTADIENE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
HEXAChLOROETHANE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
ISOPHORONE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
METHYLPHENOL, 3 & 4	UG/KG	215			48 U	330 U	330 U	290 U	250 U	170 U	260 U
NITROBENZENE	UG/KG	437	--	--	98 U	670 U	660 U	600 U	510 U	340 U	530 U
N-NITROSODIMETHYLAMINE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	44	--	--	9.8 U	68 U	66 U	60 U	51 U	34 U	54 U
N-NITROSODIPHENYLAMINE	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
PENTACHLOROPHENOL	UG/KG	215	--	--	48 U	330 U	330 U	290 U	250 U	170 U	260 U
PHENOL	UG/KG	44	--	--	9.8 U	68 U	220	49 J	32 J	110	54

* Source: MacDonald et al. 1996. Ecotoxicology 5:253-278.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL = average reporting limit

TEL = threshold effects level

PEL = probable effects level

J = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed, but not detected

**TABLE 9. BUTYLTIN CONCENTRATIONS (UG/KG) IN SEDIMENT
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	Reference Site	Pensacola Inner Harbor		Pensacola East Channel		Pensacola Bay Channel	
			MOBILE SITE C	PEN12-01/02	PEN12-03/04	PEN12-05/06	PEN12-07/08	PEN12-09/10	PEN12-11/12
MONOBUTYLTIN*	UG/KG	14	7.2 U	20 U	19 U	17 U	15 U	10 U	16 U
DIBUTYLTIN*	UG/KG	3.6	0.76 J	2.5 J	1.9 J	3 J	3.8 U	1.9 J	4.1 U
TRIBUTYLTIN*	UG/KG	4.1	2.2 U	6 U	5.7 U	5.2 U	4.4 U	3 U	4.8 U
TETRABUTYLTIN	UG/KG	4.7	2.4 U	6.8 U	6.5 U	5.9 U	5 U	3.4 U	5.4 U
TOTAL BUTYLTINS	UG/KG	--	3.4	16.1	15.3	13.7	12.0	4.7	12.8

NOTES: Bold values represent detected concentrations.

RL is reported for non-detected constituents.

* = Butyltins used to calculate total organotins

RL = average reporting limit

J = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed, but not detected

**TABLE 10. GENERAL CHEMISTRY CONCENTRATIONS IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	USEPA ACUTE CRITERIA ^(a)
DISSOLVED CYANIDE	UG/L	10	1
NITROGEN, AMMONIA	MG/L	0.1	1.92 ^(b)
NITROGEN, NITRATE	MG/L	1.06	--
NITROGEN, NITRITE	MG/L	1.06	--
NITROGEN, TOTAL KJELDAHL	MG/L	5	--
TOTAL PHOSPHORUS	MG/L	0.1	--
TOTAL SULFIDE	MG/L	3	--
TOTAL ORGANIC CARBON	MG/L	1	--

^(a) Source : USEPA 2012. *National Recommended Water Quality Criteria*

^(b) Criteria was based on mean salinity of 31.9 ppt, mean water temperature of 26.9°C, and mean pH of 8.3 as measured at mid-depth of the water column (Table 2-4).

NOTES: Bold values represent detected concentrations, shaded values exceed acute criterion.

RL is reported for non-detected constituents

RL = average reporting limit

B = detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed but not detected

Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
0.16	21	21	0.2	16	8.4	0.24	11	13
0.035 J	0.15	0.076 J	0.1 U	0.1 U	0.15	0.01 J	0.038 J	0.16
0.07 J	0.053 J	0.1 U	5 U	19	26	0.1 U	0.1 U	0.1 U
			0.1 U	0.26	0.17	5 U	14	8.9
			3 U	3 U	3 U	0.1 U	0.2	0.87
			0.98 J B	4.2 B	4.3 B	3 U	3 U	3 U
				0.8 J	3 B	3 B	1.1 B	3.2 B

**TABLE 11. METAL CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	USEPA ACUTE CRITERIA ^(a)	Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
				Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
ALUMINUM	UG/L	99	--	810	150 U	15 J B	82 J	150 U	150 U	690	150 U	150 U
ANTIMONY	UG/L	7	--	10 U	2.4 J	3.2 J	10 U	4.1 J	3 J	0.14 J	2.8 J	3.1 J
ARSENIC	UG/L	3.3	69	44	34	34	37 B	58	80	31 B	81	79
BERYLLIUM	UG/L	3.3	--	5 U	5 U	0.22 J	5 U	5 U	0.24 J	5 U	0.23 J	0.37 J
CADMIUM	UG/L	3.3	40	0.62 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM	UG/L	7	1100	42	5.5 J	64	5.1 J	57	57	8.2 J	69	73
COPPER	UG/L	7	4.8	27	3.8 J	12 B	2.5 J	9.2 J B	9.8 J B	4.2 J	10 B	12 B
IRON	UG/L	164	--	1000 B	230 J	510 B	290	580 B	500 B	260	550 B	550 B
LEAD	UG/L	3.3	210	1.2 J B	0.23 J	0.53 J B	0.19 J	0.76 J B	0.37 J B	0.41 J	0.56 J B	0.4 J B
MERCURY	UG/L	0.20	1.8	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	UG/L	3.3	74	21	3.5 J	14	2.9 J	13	17	3 J	16	19
SELENIUM	UG/L	16	290	210	120	81	150 B	83	120	110 B	110	94
SILVER	UG/L	3.3	1.9	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
THALLIUM	UG/L	3.3	--	0.25 J B	0.18 J	1.4 J	5 U	0.84 J	0.39 J	0.97 J	0.3 J	0.23 J
ZINC	UG/L	16	90	38	15 J	14 J	10 J B	69	16 J	32 B	12 J	14 J

^(a) Source : USEPA 2012. *National Recommended Water Quality Criteria*

NOTES: Bold values represent detected concentrations, shaded values exceed acute criterion.

RL is reported for non-detected constituents

RL = average reporting limit.

B = detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed but not detected

**TABLE 12. PAH CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
			Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
Low Molecular Weight PAHs (LPAHs)											
1-METHYLNAPHTHALENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
2-METHYLNAPHTHALENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
ACENAPHTHENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
ANTHRACENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
FLUORENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
NAPHTHALENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
PHENANTHRENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
TOTAL LPAHS (ND=RL) ^(a)	UG/L	--	0.67	0.67	0.67	0.67	0.74	0.74	0.67	0.67	0.70
High Molecular Weight PAHs (HPAHs)											
BENZO(A)ANTHRACENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
BENZO(A)PYRENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
CHRYSENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
FLUORANTHENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
PYRENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
TOTAL HPAHS (ND=RL) ^(a)	UG/L	--	0.57	0.57	0.57	0.57	0.63	0.63	0.57	0.57	0.6
Other PAHs											
ACENAPHTHYLENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
BENZO(B)FLUORANTHENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
BENZO(G,H,I)PERYLENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
BENZO(K)FLUORANTHENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.19	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.19 U
TOTAL PAHS (ND=RL) ^(b)	UG/L	--	1.71	1.71	1.71	1.71	1.89	1.89	1.71	1.71	1.80

NOTES: There are no USEPA acute or chronic water quality criteria for PAHs

Bold values represent detected concentrations.

RL = reported for non-detected constituents

(a) Low molecular weight and high molecular weight PAHs, as per SERIM Table 5-5 (USACE/USEPA 2008)

(b) Total PAHs is a sum of each individual PAH, NOT the sum of the LPAHs and HPAHs

RL = average reporting limit.

U = compound was analyzed but not detected

**TABLE 13. PCB CONGENER CONCENTRATIONS (NG/L) IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
			Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
PCB 8 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.26 J P	1 U	1 U	0.56 J	0.95 U	0.98 U
PCB 18 (BZ) *	NG/L	0.972	0.25 J	0.91 J	0.95 U	0.71 J	0.32 J P	0.45 J P	0.74 J	1	0.98 U
PCB 28 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 44 (BZ) *	NG/L	0.972	0.95 U	0.43 J B	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 49 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 52 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.21 J P	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 66 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 77 (BZ) *	NG/L	0.972	0.95 U	0.31 J P	0.98 P	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 87 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 101 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.37 J P	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 105 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 118 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 126 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 128 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.38 J	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 138 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.69 J	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 153 (BZ) *†	NG/L	0.972	0.95 U	0.53 J	0.96	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 156 (BZ) *	NG/L	0.972	0.95 U	0.64 J	0.95 U	0.43 J	1 U	1 U	0.69 J	0.26 J P	0.98 U
PCB 169 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 170 (BZ) *†	NG/L	0.972	0.95 U	0.32 J P	0.58 J	0.95 U	1 U	1 U	0.95 U	0.19 J P	0.58 J
PCB 180 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.57 J	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 183 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 184 (BZ) *	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 187 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.27 J	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 195 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
PCB 206 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.54 J
PCB 209 (BZ) *†	NG/L	0.972	0.95 U	0.95 U	0.95 U	0.95 U	1 U	1 U	0.95 U	0.95 U	0.98 U
Total USEPA-Region 4 PCBs (ND=RL)	NG/L	--	49.4	49.4	49.5	49.4	52.0	52.0	49.4	49.5	51.0
Total NOAA PCBs (ND=RL)	NG/L	--	34.2	34.2	34.2	34.2	36.0	36.0	34.2	34.3	35.3

* PCB congeners used for the Total USEPA-Region 4 PCB summation, as per Table 5-6 of the SERIM (USEPA/USACE 2008)

† PCB congeners used for the Total USEPA-NOAA PCB summation, as per Table 5-6 of the SERIM (USEPA/USACE 2008)

There are no USEPA saltwater acute criteria for aquatic life for the tested PCB congeners or total PCB concentrations.

NOTES: RL is reported for non-detected constituents

Bold values represent detected concentrations.

RL = average reporting limit.

J = compound was detected, but below the reporting limit (value is estimated)

**TABLE 14. CHLORINATED PESTICIDE CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	USEPA ACUTE CRITERIA ^(a)	Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
				Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
4,4'-DDD	UG/L	0.001	--	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
4,4'-DDE	UG/L	0.001	--	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
4,4'-DDT	UG/L	0.001	0.13	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
ALDRIN	UG/L	0.001	1.30	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
ALPHA-BHC	UG/L	0.001	--	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
BETA-BHC	UG/L	0.001	--	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0017	0.00095 J P
CHLORDANE	UG/L	0.012	0.09	0.012 U	0.012 U	0.06 U	0.012 U	0.064 U	0.013 U	0.012 U	0.012 U	0.012 U
CHLOROBENZIDE	UG/L	0.003	--	0.003 U	0.003 U	0.015 U	0.003 U	0.016 U	0.0033 U	0.003 U	0.003 U	0.003 U
DACHTAL	UG/L	0.002	--	0.0024 U	0.0024 U	0.012 U	0.0024 U	0.013 U	0.0026 U	0.0024 U	0.0024 U	0.0024 U
DELTA-BHC	UG/L	0.001	--	0.0006 J	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0006 J	0.0012 U	0.0012 U
DIELDRIN	UG/L	0.001	0.71	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
ENDOSULFAN-I	UG/L	0.001	0.03	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
ENDOSULFAN-II	UG/L	0.001	0.03	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
ENDOSULFAN SULFATE	UG/L	0.001	--	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
ENDRIN	UG/L	0.001	0.04	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
ENDRIN ALDEHYDE	UG/L	0.001	--	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
GAMMA-BHC (LINDANE)	UG/L	0.001	0.16	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
HEPTACHLOR	UG/L	0.001	0.05	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
HEPTACHLOR EPOXIDE	UG/L	0.001	0.05	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
METHOXYCHLOR	UG/L	0.002	--	0.0024 U	0.0024 U	0.012 U	0.0024 U	0.013 U	0.0026 U	0.0024 U	0.0024 U	0.0024 U
MIREX	UG/L	0.001	--	0.0012 U	0.0012 U	0.0062 U	0.0012 U	0.0067 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
TOXAPHENE	UG/L	0.095	0.21	0.095 U	0.095 U	0.48 U	0.095 U	0.52 U	0.1 U	0.095 U	0.095 U	0.095 U

^(a) Source : USEPA 2012. *National Recommended Water Quality Criteria*

NOTES: Bold values represent detected concentrations, shaded values exceed acute or chronic criteria

MDL is reported for non-detected constituents

RL = average reporting limit.

J = compound was detected, but below the reporting limit (value is estimated)

P = the percent difference between the original and confirmation analysis is greater than 40%

U = compound was analyzed but not detected

**TABLE 15. SEMIVOLATILE ORGANIC COMPOUND (SVOC) CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	USEPA ACUTE CRITERIA ^(a)	Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
				Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
1,2,4-TRICHLOROBENZENE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
1,2-DICHLOROBENZENE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
1,2-DIPHENYLHYDRAZINE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
1,3-DICHLOROBENZENE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
1,4-DICHLOROBENZENE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
2,2'-OXYBIS[1-CHLOROPROPANE]	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U
2,4,6-TRICHLOROPHENOL	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
2,4-DICHLOROPHENOL	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U
2,4-DIMETHYLPHENOL	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
2,4-DINITROPHENOL	UG/L	4.75	--	4.7 U	4.7 U	4.8 U	4.7 U	5.3 U	5.2 U	4.7 U	4.8 U	5.1 U
2,4-DINITROTOLUENE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
2,6-DINITROTOLUENE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
2-CHLORONAPHTHALENE	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U
2-CHLOROPHENOL	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
2-METHYLPHENOL	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
2-NITROPHENOL	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
3,3'-DICHLOROBENZIDINE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	4.75	--	4.7 U	4.7 U	4.8 U	4.7 U	5.3 U	5.2 U	4.7 U	4.8 U	5.1 U
4-BROMOPHENYL PHENYL ETHER	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
4-CHLORO-3-METHYLPHENOL	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
4-NITROPHENOL	UG/L	4.75	--	4.7 U	4.7 U	4.8 U	4.7 U	5.3 U	5.2 U	4.7 U	4.8 U	5.1 U
BENZIDINE	UG/L	19.17	--	19 U	19 U	19 U	19 U	21 U	21 U	19 U	19 U	20 U
BENZOIC ACID	UG/L	4.75	--	4.7 U	4.7 U	4.8 U	4.7 U	5.3 U	5.2 U	4.7 U	0.7 J	5.1 U
BENZYL ALCOHOL	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
BIS(2-CHLOROETHOXY)METHANE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
BIS(2-CHLOROETHYL)ETHER	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	1.92	--	1.5 J	1.9 U	2.1	1.2 J	29	3.3	1.9 U	1.9 U	2.5
BUTYL BENZYL PHTHALATE	UG/L	0.95	--	0.94 U	0.15 J B	0.95 U	0.94 U	1.1 U	0.22 J	0.94 U	0.95 U	0.55 J
DIBENZOFURAN	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
DIETHYL PHTHALATE	UG/L	0.95	--	0.94 U	0.94 U	0.24 J B	0.94 U	1.1 U	0.22 J B	0.94 U	0.95 U	0.3 J B
DIMETHYL PHTHALATE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
DI-N-BUTYL PHTHALATE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
DI-N-OCTYL PHTHALATE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
HEXAACHLOROBENZENE	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U
HEXAACHLOROBUTADIENE	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U
HEXAACHLOROCYCLOPENTADIENE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
HEXAACHLOROETHANE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
ISOPHORONE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
METHYLPHENOL, 3 & 4	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
NITROBENZENE	UG/L	1.92	--	1.9 U	1.9 U	1.9 U	1.9 U	2.1 U	2.1 U	1.9 U	1.9 U	2 U
N-NITROSODIMETHYLAMINE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
N-NITROSODI-N-PROPYLAMINE	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U
N-NITROSODIPHENYLAMINE	UG/L	0.95	--	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
PENTACHLOROPHENOL	UG/L	0.95	13	0.94 U	0.94 U	0.95 U	0.94 U	1.1 U	1 U	0.94 U	0.95 U	1 U
PHENOL	UG/L	0.19	--	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.21 U	0.19 U	0.19 U	0.2 U

^(a) Source : USEPA 2012. National Recommended Water Quality Criteria

NOTES: Bold values represent detected concentrations.

RL = reported for non-detected constituents

RL = average reporting limit.

B = detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed but not detected

**TABLE 16. DIOXIN AND FURAN CONGENER CONCENTRATIONS (PG/L) IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	TEF*	Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
				Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
2,3,7,8-TCDD	PG/L	9.4	1	9.3 U	9.4 U	9.5 U	9.3 U	11 U	10 U	9.4 U	9.5 U	0.15 Q J
1,2,3,7,8-PECDD	PG/L	47.0	1	47 U	47 U	0.65 Q J	47 U	1.6 Q J	52 U	47 U	47 U	0.94 Q J
1,2,3,4,7,8-HXCDD	PG/L	47.0	0.1	47 U	47 U	47 U	47 U	53 U	52 U	47 U	47 U	1 J
1,2,3,6,7,8-HXCDD	PG/L	47.0	0.1	47 U	1.3 Q J	0.74 Q B J	47 U	53 U	2.8 B J	47 U	47 U	2.1 Q B J
1,2,3,7,8,9-HXCDD	PG/L	47.0	0.1	47 U	1.5 J	1.5 Q J	47 U	0.77 Q J	4.2 Q J	47 U	47 U	2.8 J
1,2,3,4,6,7,8-HPCDD	PG/L	47.0	0.01	3.6 Q J	56 B	24 B J	2 J	14 Q B J	35 Q B J	47 U	12 J	31 B J
OCDD	PG/L	93.5	0.0003	77 B J	710 B	220 B	24 B J	170 B	380 B	8.5 B J	150 B	240 B
2,3,7,8-TCDF	PG/L	9.4	0.1	9.3 U	0.59 J	9.5 U	9.3 U	11 U	10 U	9.4 U	9.5 U	10 U
1,2,3,7,8-PECDF	PG/L	47.0	0.03	47 U	0.41 Q J	47 U	47 U	53 U	1 Q J	47 U	47 U	51 U
2,3,4,7,8-PECDF	PG/L	47.0	0.3	47 U	47 U	0.53 Q J	47 U	53 U	52 U	47 U	47 U	51 U
1,2,3,4,7,8-HXCDF	PG/L	47.0	0.1	47 U	0.68 Q B J	47 U	47 U	53 U	52 U	47 U	47 U	0.68 J
1,2,3,6,7,8-HXCDF	PG/L	47.0	0.1	47 U	47 U	0.67 Q B J	47 U	53 U	52 U	47 U	47 U	0.62 Q B J
2,3,4,6,7,8-HXCDF	PG/L	47.0	0.1	47 U	47 U	47 U	47 U	53 U	0.5 Q B J	47 U	47 U	0.71 Q B J
1,2,3,7,8,9-HXCDF	PG/L	47.0	0.1	47 U	47 U	0.57 Q J	47 U	53 U	52 U	47 U	47 U	51 U
1,2,3,4,6,7,8-HPCDF	PG/L	47.0	0.01	47 U	6.4 J	1.9 Q B J	47 U	53 U	1.2 Q B J	47 U	47 U	4.6 Q B J
1,2,3,4,7,8,9-HPCDF	PG/L	47.0	0.01	47 U	0.91 J	47 U	47 U	53 U	52 U	47 U	47 U	51 U
OCDF	PG/L	93.5	0.0003	1.3 J	15 B J	5.6 B J	93 U	4.4 B J	3.9 B J	94 U	2.3 Q B J	25 B J
DIOXIN TEQ (ND=RL)	PG/L	--	--	107	90.4	26.7	107	62.5	100	107	107	24.3

*Source : Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds. *Toxicological Sciences*: 93(2):223-241.

There are no USEPA saltwater acute criteria for the tested dioxin and furan congeners.

NOTES: Bold values represent detected concentrations.

RL is reported for non-detected constituents

RL = average reporting limit.

TEF = toxicity equivalency factor

TEQ = toxicity equivalency quotient

B= detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

Q = estimated maximum possible concentration (EMPC)

U = compound was analyzed, but not detected

**TABLE 17. BUTYLTIN CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)**

ANALYTE	UNITS	Average RL	Pensacola Inner Harbor			Pensacola East Channel			Pensacola Bay Channel		
			Site Water	Elutriate PEN12-01/02	Elutriate PEN12-03/04	Site Water	Elutriate PEN12-05/06	Elutriate PEN12-07/08	Site Water	Elutriate PEN12-09/10	Elutriate PEN12-11/12
MONOBUTYLTIN*	UG/L	0.480	0.47 U	0.47 U	0.48 U	0.48 U	0.53 U	0.53 U	0.47 U	0.48 U	0.51 U
DIBUTYLTIN*	UG/L	0.037	0.037 U	0.037 U	0.037 U	0.037 U	0.041 U	0.042 U	0.037 U	0.037 U	0.04 U
TRIBUTYLTIN*	UG/L	0.042	0.043 U	0.043 U	0.043 U	0.043 U	0.047 U	0.048 U	0.043 U	0.043 U	0.046 U
TETRABUTYLTIN	UG/L	0.048	0.047 U	0.047 U	0.048 U	0.048 U	0.053 U	0.053 U	0.047 U	0.048 U	0.051 U
TOTAL BUTYLTINS (ND=RL)	UG/L	--	0.35	0.35	0.36	0.36	0.40	0.40	0.35	0.36	0.38

NOTES: Bold values represent detected concentrations.

MDL is reported for non-detected constituents.

* = Butyltins used to calculate total organotins

RL = average reporting limit

U = compound was analyzed, but not detected

TABLE 18. SUMMARY OF RESULTS FOR WATER COLUMN BIOASSAYS
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)

Sample Identification	<i>Mytilus galloprovincialis</i>			<i>Americamysis bahia</i>			<i>Menidia beryllina</i>		
	48-hour EC50 (% elutriate)	Statistical Difference 100% vs. Control ^(a)	Dilution required to Achieve 0.01 EC50	96-hour LC50 (% elutriate)	Statistical Difference 100% vs. Control ^(a)	Dilution required to Achieve 0.01 LC50	96-hour LC50 (% elutriate)	Statistical Difference 100% vs. Control ^(a)	Dilution required to Achieve 0.01 LC50
Pensacola Inner Harbor									
PEN12-01/02	43.2	Yes	232	>100	No	--	>100	No	--
PEN12-03/04	74.1	Yes	135	>100	No	--	>100	No	--
Pensacola East Channel									
PEN12-05/06	>100	Yes	100	>100	No	--	>100	No	--
PEN12-07/08	86	Yes	116	>100	No	--	>100	No	--
Pensacola Bay Channel									
PEN12-09/10	>100	No	--	>100	No	--	>100	No	--
PEN12-11/12	>100	Yes	100	>100	No	--	>100	Yes	100

(a) Statistical significance analyzed at p=0.05; survival (LC50) or effect (EC50) in 100% elutriate concentration significantly lower than the control

(b) Site water was significantly different (p=0.05) from the laboratory control.

-- means no dilution required because EC50 or LC50 greater than the 100 percent elutriate and not statistically different than the laboratory control

TABLE 19A. PENSACOLA INNER HARBOR CHANNEL - TIER 2 STFATE MODEL RESULTS SUMMARY
PENSACOLA OFFSHORE ODMDS, PENSACOLA, FLORIDA

Scenario:	Pensacola Inner Harbor	Placement Volume: 10,000	
Tier II - Water Quality Criteria			
Analyte:	Ammonia	Water Quality Criterion: 1.92 Elutriate Concentration (C_s): 21 Background concentration (C_{ds}): 0.13 Dilution Required: 10.7 Dilution Factor Achieved: 233	
WQC Initial Mixing Computation Results: 4-Hour Criterion			
Time (hours)	Depth (ft)	Maximum Contaminant Concentration (C_{max}) on Grid	Dilution on Grid (D_{a-wq})
4.0	1	1.30E-01	7.85E+12
4.0	36	1.32E-01	9.84E+03
4.0	75	1.42E-01	1.72E+03
4.0	58.5	2.19E-01	2.33E+02
WQC Initial Mixing Computation Results: Disposal Site Boundary Criterion			
Depth (ft)	Time Corresponding to C_{max} Outside Disposal Site (hours)	Maximum Contaminant Concentration (C_{max}) Outside Disposal Site (percent)	Dilution Outside Disposal Site (D_{a-wq})
1	0.17	1.30E-01	NA ⁽¹⁾
36	0.17	1.30E-01	NA ⁽¹⁾
75	0.17	1.30E-01	NA ⁽¹⁾
58.5	0.17	1.30E-01	NA ⁽¹⁾
$D_{a-wq} = (C_s - C_{max}) / (C_{max} - C_{ds})$; where C_s = elutriate concentration and C_{ds} = background concentration			
Shaded row = depth of maximum concentration			
(1) Concentration above background ($C_{max} - C_{ds}$) = 0.			

TABLE 19B. PENSACOLA EAST CHANNEL - TIER 2 STFATE MODEL RESULTS SUMMARY
PENSACOLA OFFSHORE ODMDS, PENSACOLA, FLORIDA

Scenario:	Pensacola East Channel	Placement Volume:	31,000
Tier II - Water Quality Criteria			
Analyte:	Ammonia	Water Quality Criterion:	1.92
		Elutriate Concentration (C_s):	16
		Background concentration (C_{ds}):	0.13
		Dilution Required:	7.9
		Dilution Factor Achieved:	119
WQC Initial Mixing Computation Results: 4-Hour Criterion			
Time (hours)	Depth (ft)	Maximum Contaminant Concentration (C_{max}) on Grid	Dilution on Grid (D_{a-wq})
4.0	1	1.30E-01	5.45E+12
4.0	36	1.33E-01	5.38E+03
4.0	75	1.48E-01	8.86E+02
4.0	58.6	2.62E-01	1.19E+02
WQC Initial Mixing Computation Results: Disposal Site Boundary Criterion			
Depth (ft)	Time Corresponding to C_{max} Outside Disposal Site (hours)	Maximum Contaminant Concentration (C_{max}) Outside Disposal Site (percent)	Dilution Outside Disposal Site (D_{a-wq})
1	0.17	1.30E-01	NA ⁽¹⁾
36	0.17	1.30E-01	NA ⁽¹⁾
75	0.17	1.30E-01	NA ⁽¹⁾
58.6	0.17	1.30E-01	NA ⁽¹⁾
$D_{a-wq} = (C_s - C_{max}) / (C_{max} - C_{ds})$; where C_s = elutriate concentration and C_{ds} = background concentration			
Shaded row = depth of maximum concentration			
(1) Concentration above background ($C_{max} - C_{ds}$) = 0.			

TABLE 19C. PENSACOLA BAY CHANNEL - TIER 2 STFATE MODEL RESULTS SUMMARY
PENSACOLA OFFSHORE ODMDS, PENSACOLA, FLORIDA

Scenario:	Pensacola Bay Channel	Placement Volume: 40,000	
Tier II - Water Quality Criteria			
Analyte:	Ammonia	Water Quality Criterion: 1.92 Elutriate Concentration (C_s): 13 Background concentration (C_{ds}): 0.13 Dilution Required: 6.2 Dilution Factor Achieved: 99	
WQC Initial Mixing Computation Results: 4-Hour Criterion			
Time (hours)	Depth (ft)	Maximum Contaminant Concentration (C_{max}) on Grid	Dilution on Grid (D_{a-wq})
4.0	1	1.30E-01	3.98E+12
4.0	36	1.33E-01	4.35E+03
4.0	75	1.47E-01	7.34E+02
4.0	58.6	2.59E-01	9.88E+01
WQC Initial Mixing Computation Results: Disposal Site Boundary Criterion			
Depth (ft)	Time Corresponding to C_{max} Outside Disposal Site (hours)	Maximum Contaminant Concentration (C_{max}) Outside Disposal Site (percent)	Dilution Outside Disposal Site (D_{a-wq})
1	0.17	1.30E-01	NA ⁽¹⁾
36	0.17	1.30E-01	NA ⁽¹⁾
75	0.17	1.30E-01	NA ⁽¹⁾
58.6	0.17	1.30E-01	NA ⁽¹⁾
$D_{a-wq} = (C_s - C_{max}) / (C_{max} - C_{ds})$; where C_s = elutriate concentration and C_{ds} = background concentration			
Shaded row = depth of maximum concentration			
(1) Concentration above background ($C_{max} - C_{ds}$) = 0.			

TABLE 20A. PENSACOLA INNER HARBOR TIER 3 STFATE MODEL RESULTS SUMMARY
PENSACOLA OFFSHORE ODMDS, PENSACOLA, FLORIDA

Scenario: Pensacola Inner Harbor	Placement Volume (cy): 10,000		
Tier III - Water Column Toxicity			
Species: <i>Mytilus galloprovincialis</i>		LPC: 0.432	
		Dilution Required: 230	
		Dilution Achieved: 234	
Toxicity Initial Mixing Computation Results: 4-Hour Criterion			
Time (hours)	Depth (ft)	Maximum Contaminant Concentration (Cmax) on Grid	Dilution on Grid (D _{a-tox})
4.0	1	1.27E-11	7.87E+12
4.0	36	1.01E-02	9.90E+03
4.0	75	5.76E-02	1.74E+03
4.0	58.5	4.25E-01	2.34E+02
Toxicity Initial Mixing Computation Results: Disposal Site Boundary Criterion			
Depth (ft)	Time Corresponding to C _{tox} Outside Disposal Site (hours)	Maximum Contaminant Concentration (C _{tox}) Outside Disposal Site (percent)	Dilution Outside Disposal Site (D _{a-tox})
1	0.17	0.00E+00	NA ⁽¹⁾
36	0.17	0.00E+00	NA ⁽¹⁾
75	0.17	0.00E+00	NA ⁽¹⁾
58.5	0.17	0.00E+00	NA ⁽¹⁾
D _{a-tox} = (100 - C _{tox}) / C _{tox}			
Shaded row = depth of maximum concentration			
(1) Concentration outside disposal site (C _{tox} - C _{ds}) = 0.			

TABLE 20B. PENSACOLA EAST CHANNEL TIER 3 STFATE MODEL RESULTS SUMMARY
PENSACOLA OFFSHORE ODMDS, PENSACOLA, FLORIDA

Scenario:	Pensacola East Channel	Placement Volume (cy):	31,000
Tier III - Water Column Toxicity			
Species:	<i>Mytilus galloprovincialis</i>	LPC:	0.86
Dilution Required:	115	Dilution Achieved:	120
Toxicity Initial Mixing Computation Results: 4-Hour Criterion			
Time (hours)	Depth (ft)	Maximum Contaminant Concentration (Cmax) on Grid	Dilution on Grid (D _{a-tox})
4.0	1	1.82E-11	5.49E+12
4.0	36	1.84E-02	5.43E+03
4.0	75	1.12E-01	8.92E+02
4.0	58.6	8.26E-01	1.20E+02
Toxicity Initial Mixing Computation Results: Disposal Site Boundary Criterion			
Depth (ft)	Time Corresponding to C _{tox} Outside Disposal Site (hours)	Maximum Contaminant Concentration (C _{tox}) Outside Disposal Site (percent)	Dilution Outside Disposal Site (D _{a-tox})
1	0.17	0.00E+00	NA ⁽¹⁾
36	0.17	0.00E+00	NA ⁽¹⁾
75	0.17	0.00E+00	NA ⁽¹⁾
58.6	0.17	0.00E+00	NA ⁽¹⁾
D _{a-tox} = (100 - C _{tox}) / C _{tox}			
Shaded row = depth of maximum concentration			
(1) Concentration outside disposal site (C _{tox} - C _{ds}) = 0.			

TABLE 20C. PENSACOLA BAY CHANNEL TIER 3 STFATE MODEL RESULTS SUMMARY
PENSACOLA OFFSHORE ODMDS, PENSACOLA, FLORIDA

Scenario:	Pensacola Bay Channel	Placement Volume (cy):	40,000
Tier III - Water Column Toxicity			
Species:	<i>Mytilus galloprovincialis</i>	LPC:	1
Dilution Required:	99	Dilution Achieved:	100
Toxicity Initial Mixing Computation Results: 4-Hour Criterion			
Time (hours)	Depth (ft)	Maximum Contaminant Concentration (Cmax) on Grid	Dilution on Grid (D _{a-tox})
4.0	1	2.48E-11	4.03E+12
4.0	36	2.27E-02	4.40E+03
4.0	75	1.35E-01	7.40E+02
4.0	58.6	9.94E-01	9.96E+01
Toxicity Initial Mixing Computation Results: Disposal Site Boundary Criterion			
Depth (ft)	Time Corresponding to C _{tox} Outside Disposal Site (hours)	Maximum Contaminant Concentration (C _{tox}) Outside Disposal Site (percent)	Dilution Outside Disposal Site (D _{a-tox})
1	0.17	0.00E+00	NA ⁽¹⁾
36	0.17	0.00E+00	NA ⁽¹⁾
75	0.17	0.00E+00	NA ⁽¹⁾
58.6	0.17	0.00E+00	NA ⁽¹⁾
D _{a-tox} = (100 - C _{tox}) / C _{tox}			
Shaded row = depth of maximum concentration			
(1) Concentration outside disposal site (C _{tox} - C _{ds}) = 0.			

TABLE 21. RESULTS OF 10-DAY WHOLE SEDIMENT BIOASSAYS
PENSACOLA HARBOR CHANNEL, PENSACOLA, FLORIDA (SEPTEMBER 2012)

Sample Identification	<i>Neanthes arenaceodentata</i>		<i>Leptocheirus plumulosus</i>	
	No. Alive/No. Exposed ^(a)	10-Day Mean Percent Survival ^(b)	No. Alive/No. Exposed ^(a)	10-Day Mean Percent Survival ^(b)
Inner Harbor				
PEN12-01/02-SED	24 / 25	96	99 / 100	99
PEN12-03/04-SED	23 / 25	92	92 / 100	92
East Channel				
PEN12-05/06-SED	23 / 25	92	95 / 100	95
PEN12-07/08-SED	26 / 27	96	88 / 100	88
Bay Channel				
PEN12-09/10-SED	24 / 25	96	86 / 100	86 ^(c)
PEN12-11/12-SED	19 / 25	76	98 / 100	98
References				
RS-MOB-C	25 / 25	100	96 / 100	96
LAB CONTROL	25/26	96	98 / 100	98

(a) Total for five replicates of 20 organisms.

(b) Each sample was statistically compared ($p=0.05$) to reference sample RS-MOB-C.

(c) Significantly different ($p=0.05$) from reference sample RS-MOB-C.

TABLE 22. SURVIVAL RESULTS FOR 28-DAY BIOACCUMULATION TESTING
Pensacola Harbor Channel, Pensacola, Florida (September 2012)

Sample Identification	<i>Nereis virens</i>			<i>Macoma nasuta</i>		
	No. Alive/No. Exposed ^(a)	28-Day Mean Percent Survival	Statistical Difference vs. Reference ^(b)	No. Alive/No. Exposed ^(a)	28-Day Mean Percent Survival	Statistical Difference vs. Reference ^(b)
Pensacola Inner Harbor						
PEN12-01/02	104 / 125	83	No	220 / 250	88	No
PEN12-03/04	99 / 125	79	No	178 / 250	71	No
Pensacola East Channel						
PEN12-05/06	101 / 125	81	No	219 / 250	88	No
PEN12-07/08	106 / 125	85	No	225 / 250	90	No
Pensacola Bay Channel						
PEN12-09/10	107 / 125	86	No	221 / 250	88	No
PEN12-11/12	108 / 125	86	No	227 / 250	91	No
Reference and Control						
RS-MOB-C	117 / 125	94	No	238 / 250	95	No
Control	73 / 75	97	No	141/150	94	No

(a) Total for five replicates of 25 animals for *N. virens* and five replicates of fifty animals for *M. nasuta*, unless otherwise

(b) Lab Control had three replicates of 25 animals for *N. virens* and three replicates of 50 animals for *M. nasuta*

TABLE 23. MEAN METAL CONCENTRATIONS (MG/KG) IN TISSUES
Pensacola Harbor, Pensacola, Florida (September 2012)

ANALYTE	UNITS	Pre-test		Reference Site		Pensacola Inner Harbor				Pensacola East Channel				Pensacola Bay Channel			
						PEN12-01/02		PEN12-03/04		PEN12-05/06		PEN12-07/08		PEN12-09/10		PEN12-11/12	
		Clams	Worms	Clams	Worms	Clams	Worms ^(a)	Clams	Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams	Worms
		% Lipids	0.64	0.92	0.33	0.50	0.76	0.39	0.66	0.39	0.73	0.61	0.84	0.46	0.84	0.47	1.01
ARSENIC	MG/KG	0.09	0.09	2.68	2.58	3.14	2.13	2.74	2.14	2.24	2.04	0.09	2.08	0.09	2.04	0.09	0.09
CADMIUM	MG/KG	0.03	ND	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHROMIUM	MG/KG	0.19	0.18	0.18	ND	ND	ND	ND	ND	0.07	ND	ND	0.19 ^(b)	ND	0.23	ND	0.18
COPPER	MG/KG	0.19	1.67	1.62	0.96	2.18	0.95	1.45	1.05	1.48	0.84	2.18	1.01	1.56	0.92	1.58	0.93
LEAD	MG/KG	0.09	0.85	0.17	0.17	0.23	0.28	0.13	0.29	0.168 ^(b)	0.20	0.22	0.23	0.20	0.24	0.21	0.24
MERCURY	MG/KG	0.03	ND	0.03	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	0.02	ND	0.03
NICKEL	MG/KG	0.09	0.89	0.38	0.25	0.32	0.19	0.26	0.19	0.31	0.17	0.36	0.19	0.32	0.20	0.30	0.20
SILVER	MG/KG	0.03	ND	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZINC	MG/KG	11.70	8.70	10.10	30.60	10.70	8.57 ^(c)	8.33 ^(b)	8.43 ^(b)	9.54	0.49	11.40	0.49	10.30	0.50	10.80	7.94

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5.

Tissue concentrations are reported as wet weight.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

^(a) Tissue means calculated n=4 because one replicate was broken during shipping

^(b) Tissue means calculated n = 4 because an outlier was omitted from the calculation of the concentration.

^(c) Tissue means calculated n=3 because one replicate was broken during shipping and an outlier omitted from the calculation of the mean concentration

Analyte concentration is significantly greater than the reference site concentration (p>0.05), but is NOT significantly greater than pre-test concentration (p>0.05).

Analyte concentration is significantly greater than the reference site concentration AND the pre-test concentration (p>0.05).

**TABLE 24. MEAN DIOXIN CONGENER CONCENTRATIONS (NG/KG) IN TISSUES
Pensacola Harbor, Pensacola, Florida (September 2012)**

ANALYTE	UNITS	Pre-test		Reference Site		Pensacola Inner Harbor				Pensacola East Channel		
				Clams	Worms	Clams	Worms	PEN12-01/02		PEN12-03/04		
		% Lipids	0.64	0.92	0.33	0.82	0.50	0.76	0.39	0.66	0.39	0.73
2,3,7,8-TCDD	NG/KG	ND	ND	ND	ND	ND	1.10	ND	ND	ND	ND	1.08
1,2,3,7,8-PECDD	NG/KG	ND	ND	ND	ND	ND	5.47	ND	ND	ND	ND	5.45
1,2,3,4,7,8-HXCDD	NG/KG	ND	ND	ND	ND	ND	5.47	ND	ND	ND	ND	5.45
1,2,3,6,7,8-HXCDD	NG/KG	ND	ND	ND	ND	ND	5.47	ND	ND	ND	ND	5.45
1,2,3,7,8,9-HXCDD	NG/KG	ND	ND	ND	ND	ND	5.47	ND	ND	ND	ND	5.45
1,2,3,4,6,7,8-HPCDD	NG/KG	ND	ND	ND	ND	ND	5.87	ND	5.35 ^(b)	ND	ND	5.45
OCDD	NG/KG	ND	55.7	ND	12.40	20.2	49.7	13.6	40	11.6	16.0	
2,3,7,8-TCDF	NG/KG	ND	1.33	ND	1.30	ND	1.23	1.04	1.18	ND	1.08	
1,2,3,7,8-PECDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
2,3,4,7,8-PECDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
1,2,3,4,7,8-HXCDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
1,2,3,6,7,8-HXCDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
2,3,4,6,7,8-HXCDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
1,2,3,7,8,9-HXCDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
1,2,3,4,6,7,8-HPCDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
1,2,3,4,7,8,9-HPCDF	NG/KG	ND	ND	ND	ND	ND	5.47	5.23	ND	ND	5.45	
OCDF	NG/KG	ND	ND	ND	ND	ND	11.0	10.4	ND	ND	ND	10.80
DIOXIN TEQ (ND=RL)	NG/KG	11.8	5.40	8.61	3.65	11.4	2.35	11.0	5.06	12.2	8.74	

*Source : Van den Berg, M, et al. 2006. *The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. Toxicological Sciences* 93(2):223-241.

NOTES: For pre-test and control tissues $n = 3$ and for all other tissue tests $n = 5$; tissue concentrations are reported as wet weight.

Mean concentrations were lipid-normalized prior to statistical comparisons to the reference site.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

TEF = toxicity equivalency factor

TEQ = toxicity equivalency quotient

^(a) Tissue means calculated n=3 because one replicate was broken during shipping and one replicate had insufficient tissue for analysis.

^(b)Tissue means calculated n = 4 because an outlier was omitted from the calculation of the concentration.

(c) Tissue mean calculated n=4 because one replicate had insufficient tissue for analysis

Analyte concentration is significantly greater than the reference site concentration ($p < 0.05$), but is NOT significantly greater than pre-test concentration ($p > 0.05$)

TABLE 25. MEAN PAH CONCENTRATIONS (UG/KG) IN TISSUES
Pensacola Harbor, Pensacola, Florida (September 2012)

ANALYTE	UNITS	Pre-test				Reference Site				Pensacola Inner Harbor				Pensacola East Channel			
		Clams		Worms		Clams		Worms		PEN12-01/02		PEN12-03/04		Clams		Worms	
		% Lipids	0.64	0.92	0.33	0.82	0.50	0.76	0.39	0.66	Clams	Worms	Clams	Worms	Clams	Worms	PEN12-05/06
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)																	
ACENAPHTHENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACENAPHTHYLENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ANTHRACENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FLUORENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NAPHTHALENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PHENANTHRENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)																	
BENZO[A]ANTHRACENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZO[A]PYRENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHRYSENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIBENZ(A,H)ANTHRACENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FLUORANTHENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PYRENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other Polycyclic Aromatic Hydrocarbons (PAHs)																	
BENZO[B]FLUORANTHENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZO[G,H,I]PERYLENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZO[K]FLUORANTHENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
INDENO[1,2,3-CD]PYRENE	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL PAHs (ND=RL)	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5; Tissue concentrations are reported as wet weight.

Mean concentrations were lipid-normalized prior to statistical comparisons to the reference site.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

* Total PAHs is a sum of each individual PAH, NOT the sum of the LPAHs and HPAHs.

TABLE 26. MEAN PCB CONCENTRATIONS (UG/KG) IN TISSUES
 Pensacola Harbor, Pensacola, Florida (September 2012)

ANALYTE	UNITS	Pre-test		Reference Site		Pensacola Inner Harbor				Pensacola East Channel	
				Clams	Worms	PEN12-01/02	PEN12-03/04	Clams	Worms ^(a)	Clams	Worms
		% Lipids	0.64	0.92	0.33	0.82	0.50	0.39	0.66	0.39	0.73
PCB-8	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-18	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-28	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-44	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-49	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-52	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.00
PCB-66	UG/KG	ND	2.37	ND	ND	0.99 ^(b)	ND	ND	ND	ND	1.00
PCB-77	UG/KG	ND	ND	ND	ND	2.11	ND	ND	ND	ND	ND
PCB-87	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-101	UG/KG	ND	ND	ND	ND	1.89	ND	ND	0.99 ^(b)	ND	1.06
PCB-105	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-118	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-126	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-128	UG/KG	ND	ND	ND	1.14	0.99 ^(b)	1.00 ^(c)	ND	ND	ND	ND
PCB-138	UG/KG	ND	1.26	ND	1.09	1.87	3.30	ND	1.11	ND	1.10
PCB-153	UG/KG	ND	1.47	ND	2.00	1.81	3.70	ND	1.98	ND	2.24
PCB-156	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-169	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-170	UG/KG	ND	ND	ND	4.70	1.19 ^(b)	1.5 ^(c)	0.99 ^(b)	ND	ND	1.00
PCB-180	UG/KG	ND	ND	ND	4.00	0.99 ^(b)	1.17 ^(c)	ND	0.995 ^(b)	ND	1.07
PCB-183	UG/KG	ND	1.10	ND	1.34	0.99 ^(b)	1.00 ^(c)	ND	ND	ND	1.00
PCB-184	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-187	UG/KG	ND	ND	ND	2.04	0.99 ^(b)	1.07 ^(c)	ND	0.985 ^(b)	ND	1.10
PCB-195	UG/KG	ND	ND	ND	1.62	0.99 ^(b)	1.00 ^(c)	ND	ND	ND	ND
PCB-206	UG/KG	ND	0.99	ND	8.86	0.99 ^(b)	1.33 ^(c)	0.99 ^(b)	ND	ND	ND
PCB-209	UG/KG	ND	ND	ND	1.44	0.99 ^(b)	1.00 ^(c)	ND	ND	ND	ND
Total Region 4 PCBs (ND=RL)	UG/KG	35.8	41.5	36	71.6	206	337	36.1	37.8	35.7	39.4

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5; Tissue concentrations are reported as wet weight.

Mean concentrations were lipid-normalized prior to statistical comparisons to the reference site.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

^(a) Tissue means calculated n=4 because one replicate was broken during shipping

^(b) Tissue means calculated n = 4 because an outlier was omitted from the calculation of the concentration.

^(c) Tissue mean calculated n=3 because one replicate was compromised during shipping and an outlier was not used to calculate the mean concentration

TABLE 27. MEAN CHLORINATED PESTICIDE CONCENTRATIONS (UG/KG) IN TISSUES
Pensacola Harbor, Pensacola, Florida (September 2012)

ANALYTE	UNITS	Pre-test				Reference Site				Pensacola Inner Harbor			
		Clams	Worms	Clams	Worms	Clams	Worms ^(a)	Clams ^(b)	Worms	PEN12-01/02	PEN12-03/04	Clams	Worms
		% Lipids	0.64	0.92	0.33	0.82				0.50	0.76	0.39	0.66
4,4-DDE	UG/KG	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND
4,4-DDD	UG/KG	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND
4,4-DDT	UG/KG	ND	0.48	ND	0.70	ND		ND	0.56	ND	ND	ND	0.59

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5; yissue concentrations are reported as wet weight.

Mean concentrations were lipid-normalized prior to statistical comparisons to the reference site.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

^(a) Tissue means calculated n=4 because one replicate was broken during shipping

TABLE 28. MEAN BUTYLTIN CONCENTRATIONS (UG/KG) IN TISSUES

Pensacola Harbor, Pensacola, Florida (September 2012)

ANALYTE	UNITS	Pre-test		Reference Site		Pensacola Inner Harbor				Pensacola East Channel	
				Clams	Worms	Clams	Worms	PEN12-01/02		PEN12-03/04	
				Clams	Worms ^(a)	Clams ^(b)	Worms	Clams	Worms	Clams	Worms ^(b)
		% Lipids	0.64	0.92	0.33	0.82		0.50	0.76	0.39	0.66
MONOBUTYLTIN	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIBUTYLTIN	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRIBUTYLTIN	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRABUTYLTIN	UG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5; Tissue concentrations are reported as wet weight.

Mean concentrations were lipid-normalized prior to statistical comparisons to the reference site.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

^(a) Tissue means calculated n=3 because one replicate was broken during shipping and one replicate had insufficient tissue for analysis

^(b) Tissue mean calculated n=4 because one replicate had insufficient tissue for analysis

TABLE 29. COMPARISON OF THE UPPER 95% CONFIDENCE LEVELS OF THE MEAN TISSUE CONCENTRATIONS TO USFDA ACTION/GUIDANCE/TOLERANCE LEVELS^(a)
 Pensacola Harbor, Pensacola, Florida (September 2012)

ANALYTE ^(d)	UNITS	USFDA ACTION/GUIDANCE/ TOLERANCE LEVELS ^(a)		Mobile Reference Site (RS-MOB-C)		Pensacola Inner Harbor				Pensacola East Channel				Pensacola Bay Channel			
						PEN-01/02		PEN-03/04		PEN-05/06		PEN-07/08		PEN-09/10		PEN-11/12	
		Clams	Worms	Clams	Worms	Clams	Worms ^(b)	Clams	Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams	Worms
METALS																	
ARSENIC	MG/KG	86	76			2.80	2.70		3.77	2.18	3.11	2.23		3.46	2.31	0.09	2.25
CADMIUM	MG/KG	3	4			0.03	0.03		0.04	0.03	0.04	0.03		0.04	0.03	0.04	0.03
CHROMIUM	MG/KG	13	12			0.33	0.20		0.14	0.19	0.22	0.31		0.14	0.20	0.16	0.21
LEAD	MG/KG	1.7	1.5			0.21	0.19		0.28	0.36	0.18	0.43		0.18	0.28	0.24	0.31
MERCURY	MG/KG	1	1			0.04	0.03		0.03	0.04	0.04	0.03		0.04	0.03	0.03	0.03
NICKEL	MG/KG	80	70			0.44	0.26		0.40	0.23	0.33	0.22		0.38	0.23	0.44	0.25
PCBs																	
Total Region 4 PCBs (ND=RL)	UG/KG	2,000	2,000			125	195		921	1,083	120	71.6		129	63.1	--	--
PESTICIDES																	
4,4'-DDT	UG/KG	5,000	5,000			1.45	1.11		1.02	0.97	1.45	0.97		--	--	--	--

^(a)Sources: Southeast Regional Implementation Manual (SERIM), USACE/USEPA 2008.

USFDA 2001. Fish and Fishery Products Hazards and Controls Guidance. Third Edition. U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition. June.

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5.

Tissue concentrations are reported as wet weight.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

^(b) Tissue means calculated n=4 because one replicate was broken during shipping

^(c) Tissue means calculated n = 4 because an outlier was omitted from the calculation of the concentration.

^(d) Tissue means calculated n=3 because one replicate was broken during shipping and an outlier omitted from the calculation of the mean concentration

MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT (MPRSA) SECTION 103 EVALUATION

Attachment I

BATHYMETRIC SURVEYS PENSACOLA HARBOR CHANNEL

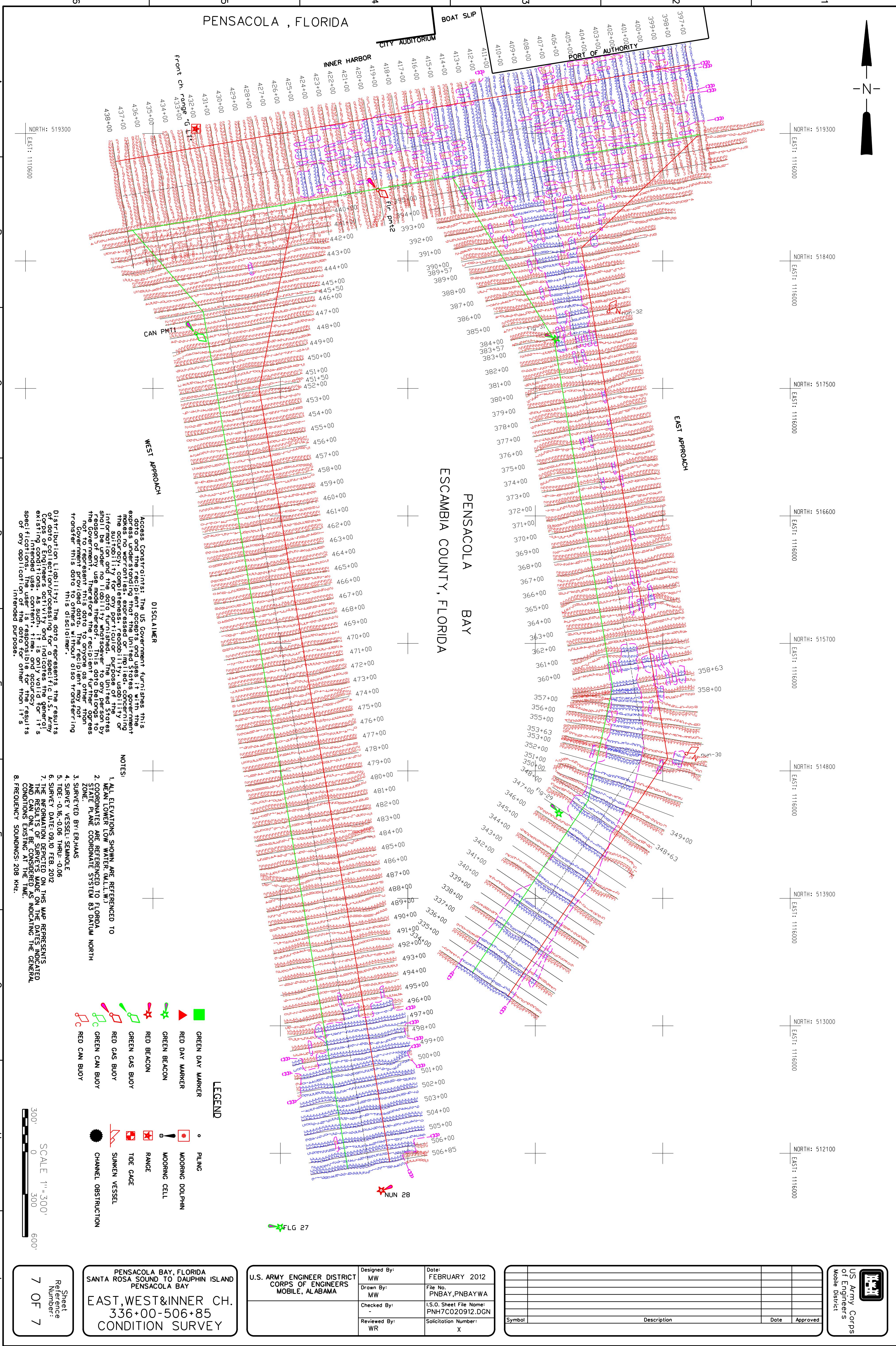


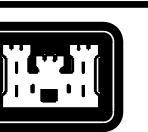
Submitted by:
U.S. Army Corps of Engineers
Mobile District
109 St. Joseph Street
Mobile, AL 36602



Prepared by:
EA Engineering, Science, and Technology
225 Schilling Circle
Suite 400
Hunt Valley, Maryland 21031

APRIL 2013





US Army Corps
of Engineers
Mobile District

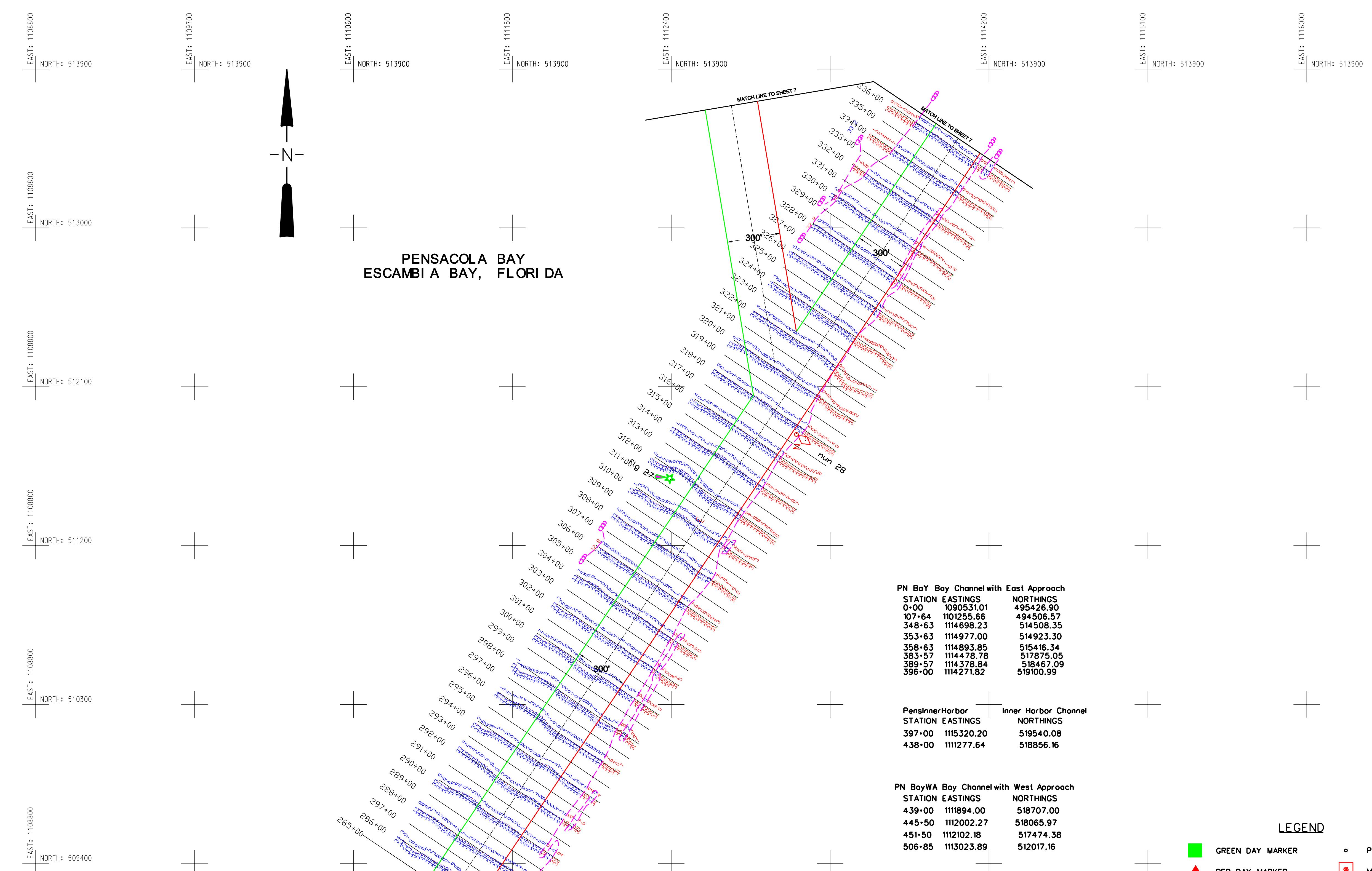
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	Symbol	
	Solicitation Number	X

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA	Designed By: MW	Date: FEBRUARY 2012
	Drawn by: MW	File No.: PNBAY_2-08-09-12
	Checked By: +	LSO Sheet File Name: PNBEC020812.DGN
	Reviewed By: WR	Solicitation Number:

PENSACOLA BAY, FLORIDA
SANTA ROSA/PENSACOLA ISLAND
BAY, EAST/WEST CHAN.
285+00 - 336+00
CONDITION SURVEY

Sheet Reference Number:
6 OF 7

PENSACOLA BAY ESCAMBIA BAY, FLORIDA



PN BoY Boy Channel with East Approach
STATION EASTINGS NORTHINGS
0·00 1090531.01 495426.90
107·64 1101255.66 494506.57
348·63 1114698.23 514508.35
353·63 1114977.00 514923.30
358·63 1114893.85 515416.34
383·57 1114478.78 517875.05
382·57 1114378.84 518751.09
398·00 1114271.82 519100.99

Pensinner Harbor Inner Harbor Channel
STATION EASTINGS NORTHINGS
397·00 1115320.20 519540.08
438·00 1111277.64 518856.16

PN BayWA Boy Channel with West Approach
STATION EASTINGS NORTHINGS
439·00 1111894.00 518707.00
445·50 1112002.27 518065.97
451·50 1112102.18 517474.38
506·85 1113023.89 512017.16

LEGEND

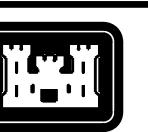
- GREEN DAY MARKER
- ▲ RED DAY MARKER
- ★ GREEN BEACON
- ★ RED BEACON
- PILING
- MOORING DOLPHIN
- MOORING CELL
- RANGE
- TIDE GAGE
- SUNKEN VESSEL
- CHANNEL OBSTRUCTION

- NOTES:
- ALL ELEVATIONS SHOWN ARE REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.)
 - COORDINATES ARE REFERENCED TO FLORIDA STATE PLANE COORDINATE SYSTEM 83 DATUM NORTH ZONE.
 - SURVEYED BY: ER, HAAS
 - SURVEY VESSEL: SEMINOLE
 - TIDE: -0.16 THRU: -0.16, -0.06
 - SURVEY DATE: 08.09 FEB 2012
 - THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THE TIME.
 - FREQUENCY SOUNDINGS: 208 KHz.

SCALE 1" = 300'
0 300' 600'

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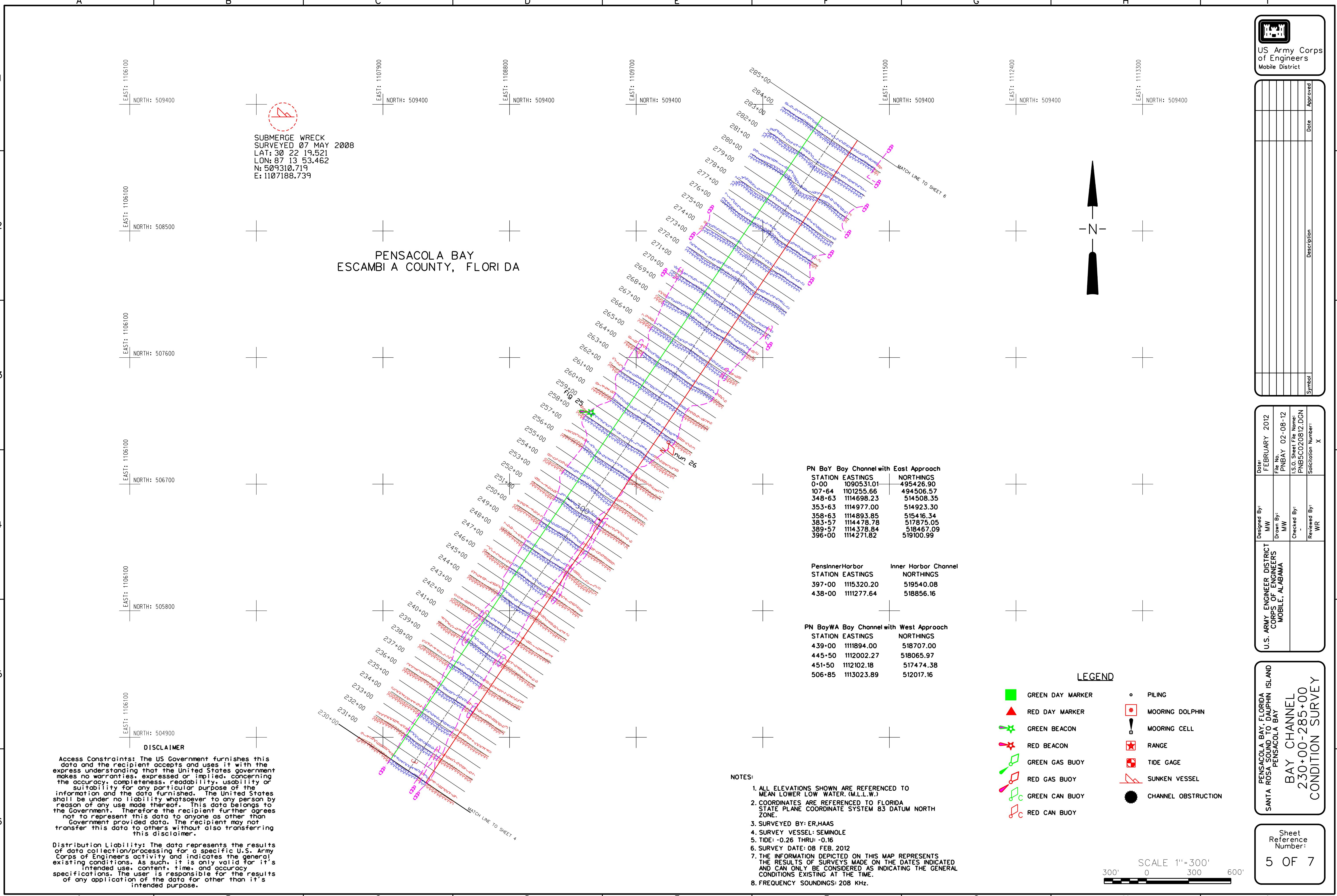
US Army Corps
of Engineers
Mobile District

	Date	Approved
	Description	
	Symbol	

U.S. ARMY ENGINEER DISTRICT MOBILE, ALABAMA	Designed By: MW	Date: FEBRUARY 2012
	Drawn By: MW	File No. PNBAY 02-05-12
	Checked By: WR	ISO Sheet File Name: PNBSC020812.DGN
	Reviewed By: WR	Solicitation Number: X

PENSACOLA BAY, FLORIDA SANTA ROSA, PENSACOLA ISLAND BAY CHANNEL 230+00 - 285+00 CONDITION SURVEY
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Sheet Reference Number: 5 OF 7





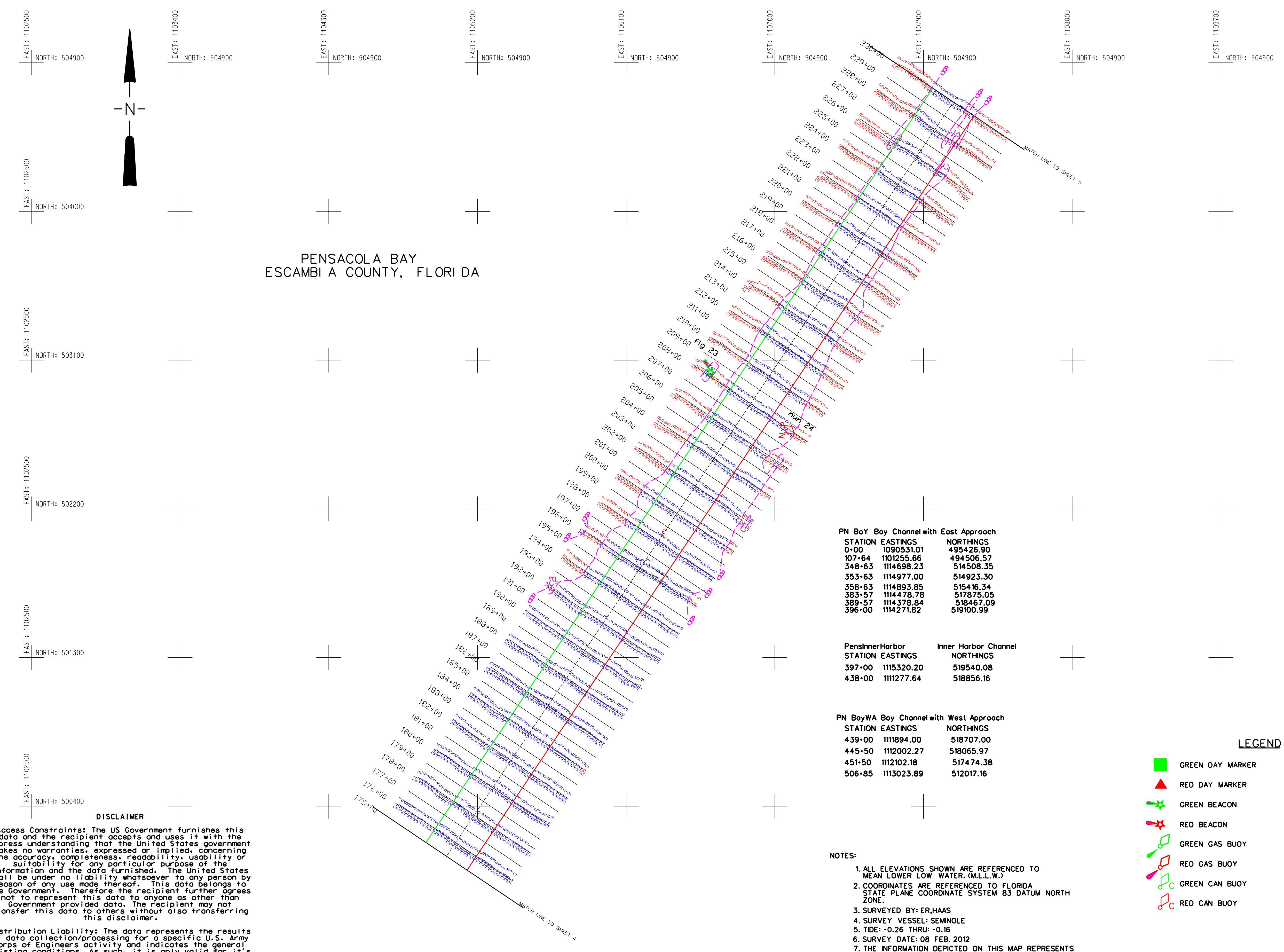
US Army Corps
of Engineers
Mobile District

		Date	Approved
		Description	
		Symbol	

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA	Designed By: MW	Date: FEBRUARY 2012
	Drawn By: MW	File No. PNBAY 02-05-12
	Checked By: +	LSO Sheet File Name: PNBAYC020812.DGN
	Reviewed By: WR	Solicitation Number: X

PENSACOLA BAY, FLORIDA SANTA ROSA, DAPHIN ISLAND BAY CHANNEL 175+00-230+00 CONDITION SURVEY

Sheet Reference Number: 4 OF 7



SCALE 1"=300'
0 300 600'

300'

0

300'

600'

- LEGEND**
- GREEN DAY MARKER
 - ▲ RED DAY MARKER
 - ★ GREEN BEACON
 - ★ RED BEACON
 - GREEN GAS BUOY
 - RED GAS BUOY
 - GREEN CAN BUOY
 - RED CAN BUOY
 - PILING
 - MOORING DOLPHIN
 - MOORING CELL
 - RANGE
 - TIDE GAGE
 - △ SUNKEN VESSEL
 - CHANNEL OBSTRUCTION

MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT (MPRSA) SECTION 103 EVALUATION

Attachment II

STFATE MODEL RESULTS PENSACOLA INNER HARBOR CHANNEL, PENSACOLA EAST CHANNEL, AND PENSACOLA BAY CHANNEL



Submitted by:
U.S. Army Corps of Engineers
Mobile District
109 St. Joseph Street
Mobile, AL 36602



Prepared by:
EA Engineering, Science, and Technology
225 Schilling Circle
Suite 400
Hunt Valley, Maryland 21031

APRIL 2013

STFATE Model Results

Pensacola Inner Harbor Channel

Tier 2 Acute Water Quality Run

Constituent = Ammonia
Dilution Required = 11

Placement Volume = 10,000 cubic yards

Tier 3 Water Column Bioassay Run

Lowest EC50 = 43.2 Percent Elutriate
Dilution Required = 232

Placement Volume = 10,000 cubic yards

STFATE Model Inputs: Pensacola Inner Harbor

INPUT PARAMETER	UNITS	VALUE
SITE DESCRIPTION		
Disposal Site Name		Pensacola ODMDS
Number of grid points (L-R, +z dir)		96
Number of grid points (T-B, +x dir)		96
Grid spacing (Left to Right) Z-Axis	ft	250
Grid spacing (Top to Bottom) X-Axis	ft	250
Constant water depth	ft	75
Bottom roughness	ft	0.005
Bottom slope (x-dir)	deg	0
Bottom slope (z-dir)	deg	0
Number of points in density profile		3
	1 g/cc	1.0248
	36 g/cc	1.0267
	75 g/cc	1.0271

AMBIENT VELOCITY

Type of velocity profile (>= 0.1 fps)		Depth-Averaged
		Yes
	Depth ft	Velocity X (fps)
	30	0.000
	56	0
		-0.750
		-0.530

STFATE Model Inputs: Pensacola Inner Harbor

INPUT PARAMETER	UNITS	VALUE
DISPOSAL OPERATION		
Disposal point top of grid (X-Axis)	ft	11,250
Disposal point left edge of grid (Z-Axis)	ft	16,875
Dumping Over Depression		No
Bottom depression length x-direction	ft	0
Bottom depression length z-direction	ft	0
Bottom depression average depth	ft	0
Location of Disposal Site		
Upper Left Corner Distance from Top Edge (X)	ft	6,000
Upper Left Corner Distance from Left Edge (Z)	ft	4,000
Lower Right Corner Distance from Top Edge (X)	ft	16,500
Lower Right Corner Distance from Left Edge (Z)	ft	19,500
Length of vessel bin	ft	319
Width of vessel bin	ft	59
Distance Between Bins	ft	5
Predisposal draft	ft	25.5
Postdisposal draft	ft	13
Time to empty vessel	s	60
Number of Bins that Open Simultaneously	s	1
Number of Discrete Openings of Sets of Bins	s	1
Vessel velocity in x-direction	ft/s	7
Vessel velocity in z-direction	ft/s	-7
Number of layers		1
Volume of each layer	yd ³	Variable

COEFFICIENTS

Settling coef (BETA)		0.000
Apparent mass coefficient (CM)		1.000
Drag coefficient (CD)		0.500
Form drag collapse cloud (CDRAG)		1.000
Skin friction collapse cloud (CFRIC)		0.010
Drag ellipse wedge (CD3)		0.100
Drag plate (CD4)		1.000
Friction between cloud and bottom (FRICTN)		0.010
4/3 Law horizontal diffusion coefficient (ALAMDA)		0.001
Unstratified vertical diffusion coefficient (AKY0)		Pritchard Expression
Cloud/ambient density gradient ratio (GAMA)		0.250
Turbulent thermal entrainment (ALPHA0)		0.235
Entrainment collapse (ALPHAC)		0.100
Stripping factor (CSTRIP)		0.003

STFATE Model Inputs: Pensacola Inner Harbor

INPUT PARAMETER	UNITS	VALUE
-----------------	-------	-------

INPUT, EXECUTION & OUTPUT KEYS

Process to simulate		Disp. from Split-Hull Barge/Scow
Duration of simulation	s	14,400
Long Term Time Step	s	600
Convective descent output		
Collapse phase output option		
Number of print times for diffusion		
Number of depths for output		3
Depths for output	ft	1, 36, 75

DREDGE MATERIAL

Location		Pensacola Inner Harbor
Bulking Factor		1.7 (sand/gravel), 2.5 (silt/clay)

Water Quality - Tier II

Contaminant		Ammonia
Acute Water Quality Criteria at Edge of Mixing Zone (C_{wq})	mg/L	1.92
Predicted initial concentration in fluid (C_s)	mg/L	21
Background concentration (C_{ds})	mg/L	0.13
Dilution Required (D_r)		11

Toxicity - Tier III

		Lowest
EC50	% Elutriate	43.2
0.01 EC50	% Elutriate	0.432
Dilution Required		230

Summary of STFATE Modeling for Placement of Dredged Material from the Pensacola Inner Harbor into the Pensacola Offshore ODMDS.

Placement Volume (cy)	1-hr		4-hrs		Tier II WQ Violation?	Tier III WQ Violation?
	Dilution Factor	Feet Traveled	Dilution Factor	Feet Traveled	Dilution Required = 11	Dilution Required = 230
4,000	30	1,463	574	5,647	No	No
8,000	16	1,463	293	5,647	No	No
10,000	15	1,463	234	5,647	No	No
11,000	14	1,463	214	5,647	No	Yes

Pensacola Inner Harbor Tier II - 10000 cu yd

Pensacola Inner Harbor - Tier II - 10000 cu yd

←→

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: Pensacola Inner Harbor - Tier II - 10000 cu yd

FILE: TmpFile.DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT)
AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT #25 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #67 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT #17 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #79 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

VERTICAL DIFFUSION COEFFICIENT (AKYO) COMPUTED FROM Pritchard EQUATION
(IPRIT = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND
TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER II OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WATER QUALITY WITH CRITERIA (KEY3 = 2).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED
(IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 3
DEPTH(S):

Pensacola Inner Harbor Tier II - 10000 cu yd
 1.00 FT
 36.00 FT
 75.00 FT

[♀] GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96
 NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96
 GRID SPACING IN Z-DIRECTION (DZ) = 250.00000 FT
 GRID SPACING IN X-DIRECTION (DX) = 250.00000 FT
 CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 75.00000 FT.

[♀] DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
2	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
3	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
4	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
5	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
6	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
7	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
8	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
9	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
10	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
11	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
12	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
13	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
14	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
15	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
16	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
17	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
18	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
19	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
20	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
21	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
22	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.

LEGEND FOR CODED GRID: W = WATER POINT
L = LAND POINT
O = OPEN BOUNDARY
B = DISPOSAL SITE BOUNDARY
D = DUMP LOCATION
X = DUMMY POINT

NUMBER OF GRID POINTS WITHIN ESTUARY = 8464

DISPOSAL LOCATION:

THE DUMP LOCATION IS 0.1125E+05 FT (XBARGE) OR ABOUT GRID POINT #46 FROM
THE TOP OF THE GRID
AND 0.1688E+05 FT (ZBARGE) OR ABOUT GRID POINT #69 FROM THE LEFT EDGE
OF THE GRID.

THE BOTTOM SLOPE IN THE X-DIRECTION AT THE DUMP SITE (SLOPEX, POSITIVE IF DEPTH INCREASES FROM TOP OF GRID TO BOTTOM OF GRID) IS 0.00 DEGREES.

THE BOTTOM SLOPE IN THE Z-DIRECTION AT THE DUMP SITE (SLOPEZ, POSITIVE IF DEPTH INCREASES)

Pensacola Inner Harbor Tier II - 10000 cu yd
FROM LEFT SIDE OF GRID TO RIGHT SIDE OF GRID) IS 0.00 DEGREES.

THE DISPOSAL LOCATION IS NOT AT A HOLE OR DEPRESSION. (DHOLE = 0.0)

AMBIENT DENSITY PROFILE:

DEPTH (FT)	DENSITY (G/CC)
0. 0000E+00	1. 0248
36. 00	1. 0267
75. 00	1. 0271

COMPUTED DEPTH:

THE DEPTH AT THE DUMP LOCATION WAS INTERPOLATED TO BE 75.00 FT.

VELOCITY DISTRIBUTION:

TWO-VELOCITY PROFILES ARE SPECIFIED IN BOTH X AND Z DIRECTIONS FOR USE AT ALL GRID POINTS PROVIDING "QUICK LOOKS".

DEPTH IN FT IS ASSUMED CONSTANT AND VELOCITIES IN FPS ARE CONSIDERED STEADY IN TIME.

VELOCITY PROFILE PARAMETERS FOLLOW...

FROM TOP TO BOTTOM ON GRID
FROM LEFT TO RIGHT ON GRID
UPPER: DEPTH, DU1 = 30.0 X-VELOCITY, UU1 = 0.000E+00
DEPTH, DW1 = 30.0 Z-VELOCITY, WW1 = -0.750
LOWER: DEPTH, DU2 = 56.0 X-VELOCITY, UU2 = 0.000E+00
DEPTH, DW2 = 56.0 Z-VELOCITY, WW2 = -0.530

[♀] BOTTOM SHEAR STRESS, LBS/SQ FT:

M N=	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

♀ TIME PARAMETERS:

DURATION OF THE DISPOSAL TREI = 60.00 SECONDS

DURATION OF THE SIMULATION TSTOP = 14400.00 SECONDS

LONG-TERM TIME STEP USED IN THE SIMULATION: RTI = 600.00 SECONDS

HOPPER DREDGE DESCRIPTION:

TOTAL NUMBER OF BINS = 1

NUMBER OF BINS OPENING SIMULTANEOUSLY NBLNS = 1

Pensacola Inner Harbor Tier II - 10000 cu yd

NUMBER OF DISCHARGES, NOPENS = 1

LENGTH OF BIN, BINL = 0.32E+03 FT

WIDTH OF BIN, BINW = 59. FT

DISTANCE BETWEEN BINS, TDIS = 5.0 FT

FT SIMULATED LENGTH OF DISCHARGE PARALLEL TO FORE-AFT AXIS, BARGL = 0.32E+03

FT SIMULATED WIDTH OF DISCHARGE PERPENDICULAR TO FORE-AFT AXIS, BARGW = 59.

DRAFT OF LOADED HOPPER DREDGE, DREL1 = 25.5 FT

DRAFT OF UNLOADED HOPPER DREDGE, DREL2 = 13.0 FT

♀ MODEL COEFFICIENTS READ FROM INPUT:

TURBULENT THERMAL ENTRAINMENT ALPHAO = 0.2350

SETTLING COEFFICIENT BETA = 0.0000

APPARENT MASS COEFFICIENT CM = 1.0000

DRAG COEFFICIENT FOR A SPHERE CD = 0.5000

RATIO--CLOUD/AMBIENT DENSITY GRADIENTS GAMA = 0.2500

FORM DRAG FOR COLLAPSING CLOUD CDRAG = 1.0000

SKIN FRICTION FOR COLLAPSING CLOUD CFRIC = 0.0100

DRAG FOR AN ELLIPTICAL WEDGE CD3 = 0.1000

DRAG FOR A PLATE CD4 = 1.0000

ENTRAINMENT IN COLLAPSE ALPHAC = 0.1000

FRICTION BETWEEN CLOUD AND BOTTOM FRICTN = 0.0100

4/3 LAW HORIZ. DIFF. DISSIPATION FACTOR ALAMDA = 0.0010

UNSTRATIFIED WATER VERT. DIFF. COEF. AKYO = 0.0250

STRIPPING COEF. OF FINES DURING CONVECTIVE DESCENT= 0.0030

♀ MATERIAL DESCRIPTION: 4 SOLIDS FRACTIONS

LAYER 1

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)	FALL VELOCITY (FPS)	DEPOSITIONAL VOID RATIO	CHARACTER
Gravel	2.700	0.0000E+00	1.00000	0.5000	

NONCOHESIVE

Critical shear stress for deposition = 99.00 LBS/SQ. FT.
SEDIMENT FRACTION WILL NOT BE STRIPPED DURING CONVECTIVE DESCENT.

Pensacola Inner Harbor Tier II - 10000 cu yd

NONCOHESIVE	SAND	2.700	0.2000E-02	0.10000	0.6000	
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.2500E-01 LBS/SQ. FT.					
	SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Silt	2.650	0.2500E-01	0.01000	4.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.8500E-02 LBS/SQ. FT.					
	SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Clay	2.650	0.1800E-01	0.00200	7.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.3800E-02 LBS/SQ. FT.					
	SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					

WATER QUALITY ANALYSIS DATA:

CONCENTRATIONS OF Ammonia FOLLOWING INITIAL MIXING OF THE FLUID ARE COMPUTED FOR WATER QUALITY EVALUATIONS.

THE INITIAL CONCENTRATION OF Ammonia IS 21.0000 MG/L AND ITS BACKGROUND CONCENTRATION IS 0.1300000 MG/L.

THE WATER QUALITY CRITERIA FOR Ammonia IS 1.920000 MG/L.

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)
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FLUID	1.016	0.9550
-------	-------	--------

[♀] DISCHARGE PARAMETERS:

VOLUME OF LAYER 1 = 0.1000E+05 CU YD

INITIAL RADIUS OF CLOUD, RB = 50.51673 FT

INITIAL DEPTH OF CLOUD CENTROID, DREL = 40.51 FT

INITIAL CLOUD VELOCITIES...

X-DIRECTION (FROM TOP TO BOTTOM OF GRID), CU(1) = 7.000 FPS

Y-DIRECTION (FROM SURFACE TO BOTTOM), CV(1) = 0.1310 FPS

Z-DIRECTION (FROM LEFT TO RIGHT OF GRID), CW(1) = -7.000 FPS

BULK PARAMETERS:

BULK DENSITY, RO0 = 1.089439 G/CC

AGGREGATE OR BULK VIDS RATIO, BVOID = 5.527

[♀] CONVECTIVE DESCENT PHASE:

IN TRIAL #1 THE DESCENT PHASE TIME STEP (DT) WAS 0.26248496E-02 SECONDS.

		Pensacola	Inner Harbor	Tier II - 10000	cu yd	
0. 000E+00	1. 00	58. 5	0. 149E+01	0. 162E+01	11750.	15500.
	1. 17	0. 130E+00	58. 5	0. 133E+01	0. 146E+01	11750.
0. 000E+00	1. 33	0. 130E+00	58. 5	0. 108E+01	0. 121E+01	11750.
0. 000E+00	1. 50	0. 130E+00	58. 5	0. 851E+00	0. 981E+00	11750.
0. 000E+00	1. 67	0. 130E+00	58. 5	0. 668E+00	0. 798E+00	11750.
0. 000E+00	1. 83	0. 130E+00	58. 5	0. 546E+00	0. 676E+00	11750.
0. 000E+00	2. 00	0. 130E+00	58. 5	0. 474E+00	0. 604E+00	11750.
0. 000E+00	2. 17	0. 130E+00	58. 5	0. 406E+00	0. 536E+00	11750.
0. 000E+00	2. 33	0. 130E+00	58. 5	0. 346E+00	0. 476E+00	11750.
0. 000E+00	2. 50	0. 130E+00	58. 5	0. 296E+00	0. 426E+00	11750.
0. 000E+00	2. 67	0. 130E+00	58. 5	0. 254E+00	0. 384E+00	11750.
0. 000E+00	2. 83	0. 130E+00	58. 5	0. 219E+00	0. 349E+00	11750.
0. 000E+00	3. 00	0. 130E+00	58. 5	0. 190E+00	0. 320E+00	11750.
0. 000E+00	3. 17	0. 130E+00	58. 5	0. 166E+00	0. 296E+00	11750.
0. 000E+00	3. 33	0. 130E+00	58. 5	0. 145E+00	0. 275E+00	11750.
0. 000E+00	3. 50	0. 130E+00	58. 5	0. 128E+00	0. 258E+00	11750.
0. 000E+00	3. 67	0. 130E+00	58. 5	0. 113E+00	0. 243E+00	11750.
0. 000E+00	3. 83	0. 130E+00	58. 5	0. 100E+00	0. 230E+00	11750.
0. 000E+00	4. 00	0. 130E+00	58. 5	0. 893E-01	0. 219E+00	11750.
0. 000E+00		0. 130E+00				11250.

RESULT: THE WATER QUALITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

♀

Pensacola Inner Harbor Tier III - 10000 cu yd

Pensacola Inner Harbor - Tier III - 10000 cu yd

←→

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: Pensacola Inner Harbor - Tier III - 10000 cu yd

FILE: TmpFile.DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT)
AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT #25 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #67 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT #17 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #79 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

VERTICAL DIFFUSION COEFFICIENT (AKYO) COMPUTED FROM Pritchard EQUATION
(IPRIT = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND
TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER III OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WITH TOXICITY CRITERIA (KEY3 = 3).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED
(IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 3
DEPTH(S):

Pensacola Inner Harbor Tier III - 10000 cu yd
 1.00 FT
 36.00 FT
 75.00 FT

[♀] GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96
 NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96
 GRID SPACING IN Z-DIRECTION (DZ) = 250.00000 FT
 GRID SPACING IN X-DIRECTION (DX) = 250.00000 FT
 CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 75.00000 FT.

[♀] DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
2	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
3	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
4	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
5	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
6	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
7	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
8	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
9	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
10	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
11	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
12	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
13	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
14	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
15	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
16	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
17	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
18	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
19	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
20	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
21	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
22	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.

LEGEND FOR CODED GRID: W = WATER POINT
L = LAND POINT
O = OPEN BOUNDARY
B = DISPOSAL SITE BOUNDARY
D = DUMP LOCATION
X = DUMMY POINT

NUMBER OF GRID POINTS WITHIN ESTUARY = 8464

DISPOSAL LOCATION:

THE DUMP LOCATION IS 0.1125E+05 FT (XBARGE) OR ABOUT GRID POINT #46 FROM THE TOP OF THE GRID
AND 0.1688E+05 FT (ZBARGE) OR ABOUT GRID POINT #69 FROM THE LEFT EDGE OF THE GRID.

THE BOTTOM SLOPE IN THE X-DIRECTION AT THE DUMP SITE (SLOPEX, POSITIVE IF DEPTH INCREASES FROM TOP OF GRID TO BOTTOM OF GRID) IS 0.00 DEGREES.

THE BOTTOM SLOPE IN THE Z-DIRECTION AT THE DUMP SITE (SLOPEZ, POSITIVE IF DEPTH INCREASES)

Pensacola Inner Harbor Tier III - 10000 cu yd
FROM LEFT SIDE OF GRID TO RIGHT SIDE OF GRID) IS 0.00 DEGREES.

THE DISPOSAL LOCATION IS NOT AT A HOLE OR DEPRESSION. (DHOLE = 0.0)

AMBIENT DENSITY PROFILE:

DEPTH (FT)	DENSITY (G/CC)
0.0000E+00	1.0248
36.00	1.0267
75.00	1.0271

COMPUTED DEPTH:

THE DEPTH AT THE DUMP LOCATION WAS INTERPOLATED TO BE 75.00 FT.

VELOCITY DISTRIBUTION:

TWO-VELOCITY PROFILES ARE SPECIFIED IN BOTH X AND Z DIRECTIONS FOR USE AT ALL GRID POINTS PROVIDING "QUICK LOOKS".

DEPTH IN FT IS ASSUMED CONSTANT AND VELOCITIES IN FPS ARE CONSIDERED STEADY IN TIME.

VELOCITY PROFILE PARAMETERS FOLLOW...

FROM TOP TO BOTTOM ON GRID
FROM LEFT TO RIGHT ON GRID
UPPER: DEPTH, DU1 = 30.0 X-VELOCITY, UU1 = 0.000E+00
DEPTH, DW1 = 30.0 Z-VELOCITY, WW1 = -0.750
LOWER: DEPTH, DU2 = 56.0 X-VELOCITY, UU2 = 0.000E+00
DEPTH, DW2 = 56.0 Z-VELOCITY, WW2 = -0.530

[♀] BOTTOM SHEAR STRESS, LBS/SQ FT:

M N=	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

♀ TIME-PARAMETERS

DURATION OF THE DISPOSAL TREEL (S-22 SECONDS)

DURATION OF THE SIMULATION TSTOP 14400.00 SECONDS

LONG-TERM TIME STEP USED IN THE SIMULATION - DT = 600.00 SECONDS

HOPPER PREFACE DESCRIPTION

TOTAL NUMBER OF BINS

NUMBER OF BINS OPENING SIMULTANEOUSLY NBLNS = 1

Pensacola Inner Harbor Tier III - 10000 cu yd

NUMBER OF DISCHARGES, NOPENS = 1

LENGTH OF BIN, BINL = 0.32E+03 FT

WIDTH OF BIN, BINW = 59. FT

DISTANCE BETWEEN BINS, TDIS = 5.0 FT

FT SIMULATED LENGTH OF DISCHARGE PARALLEL TO FORE-AFT AXIS, BARGL = 0.32E+03

FT SIMULATED WIDTH OF DISCHARGE PERPENDICULAR TO FORE-AFT AXIS, BARGW = 59.

DRAFT OF LOADED HOPPER DREDGE, DREL1 = 25.5 FT

DRAFT OF UNLOADED HOPPER DREDGE, DREL2 = 13.0 FT

♀ MODEL COEFFICIENTS READ FROM INPUT:

TURBULENT THERMAL ENTRAINMENT ALPHAO = 0.2350

SETTLING COEFFICIENT BETA = 0.0000

APPARENT MASS COEFFICIENT CM = 1.0000

DRAG COEFFICIENT FOR A SPHERE CD = 0.5000

RATIO--CLOUD/AMBIENT DENSITY GRADIENTS GAMA = 0.2500

FORM DRAG FOR COLLAPSING CLOUD CDRAG = 1.0000

SKIN FRICTION FOR COLLAPSING CLOUD CFRIC = 0.0100

DRAG FOR AN ELLIPTICAL WEDGE CD3 = 0.1000

DRAG FOR A PLATE CD4 = 1.0000

ENTRAINMENT IN COLLAPSE ALPHAC = 0.1000

FRICTION BETWEEN CLOUD AND BOTTOM FRICTN = 0.0100

4/3 LAW HORIZ. DIFF. DISSIPATION FACTOR ALAMDA = 0.0010

UNSTRATIFIED WATER VERT. DIFF. COEF. AKYO = 0.0250

STRIPPING COEF. OF FINES DURING CONVECTIVE DESCENT= 0.0030

♀ MATERIAL DESCRIPTION: 4 SOLIDS FRACTIONS

LAYER 1

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)	FALL VELOCITY (FPS)	DEPOSITIONAL VOID RATIO	CHARACTER
Gravel	2.700	0.0000E+00	1.00000	0.5000	

NONCOHESIVE

Critical shear stress for deposition = 99.00 LBS/SQ. FT.
SEDIMENT FRACTION WILL NOT BE STRIPPED DURING CONVECTIVE DESCENT.

Pensacola Inner Harbor Tier III - 10000 cu yd

NONCOHESIVE	SAND	2.700	0.2000E-02	0.10000	0.6000	
	CRI TI CAL SHEAR STRESS FOR DEPOSITI ON =	0.2500E-01	LBS/SQ. FT.			
	SEDI MENT FRACTI ON WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Si lt	2.650	0.2500E-01	0.01000	4.500	COHESIVE
	CRI TI CAL SHEAR STRESS FOR DEPOSITI ON =	0.8500E-02	LBS/SQ. FT.			
	SEDI MENT FRACTI ON WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Cl ay	2.650	0.1800E-01	0.00200	7.500	COHESIVE
	CRI TI CAL SHEAR STRESS FOR DEPOSITI ON =	0.3800E-02	LBS/SQ. FT.			
	SEDI MENT FRACTI ON WILL BE STRIPPED DURING CONVECTIVE DESCENT.					

TOXI CI TY ANALYSIS DATA:

CONCENTRATI ONS OF FLUID IN TERMS OF PERCENT OF THE DREDGED MATERIAL FOLLOWING INITIAL MIXING ARE COMPUTED FOR WATER QUALITY EVALUATI ONS.

THE I NITIAL CONCENTRATI ON OF FLUID IS 100. PERCENT AND ITS BACKGROUND CONCENTRATI ON IS 0.000E+00 PERCENT.

THE DI LUTI ON REQUI RED TO MEET TOXI CI TY CRI TERIA IS 0.432000 PERCENT. (TYPICALLY, 1 PERCENT OF THE LC50)

DESCRIPTI ON	SPEC. GRAV. OR DENSIT Y (GM/CC)	VOLUMETRIC CONCENTRATI ON (VOL/VOL)
--------------	---------------------------------	-------------------------------------

FLUID 1.016 0.9550

♀ DISCHARGE PARAMETERS:

VOLUME OF LAYER 1 = 0.1000E+05 CU YD

I NITIAL RADIUS OF CLOUD, RB = 50.51673 FT

I NITIAL DEPTH OF CLOUD CENTROID, DREL = 40.51 FT

I NITIAL CLOUD VELOCITI ES...

X-DIRECTI ON (FROM TOP TO BOTTOM OF GRID), CU(1) = 7.000 FPS

Y-DIRECTI ON (FROM SURFACE TO BOTTOM), CV(1) = 0.1310 FPS

Z-DIRECTI ON (FROM LEFT TO RI GHT OF GRID), CW(1) = -7.000 FPS

BULK PARAMETERS:

BULK DENSIT Y, RO0 = 1.089439 G/CC

AGGREGATE OR BULK VOIDS RATI O, BVOID = 5.527

♀ CONVECTIVE DESCENT PHASE:

IN TRI AL #1 THE DESCENT PHASE TIME STEP (DT) WAS 0.26248496E-02 SECONDS.

	Pensacola	Inner Harbor	Tier	10000 cu yd	
3.67	58.5	0.539E+00	11750.	11750.	0.000E+00
3.83	58.5	0.478E+00	11750.	11500.	0.000E+00
4.00	58.5	0.425E+00	11750.	11250.	0.000E+00

RESULT: THE TOXICITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

♀

STFATE Model Results

Pensacola East Channel

Tier 2 Acute Water Quality Run

Constituent = Ammonia
Dilution Required = 8

Placement Volume = 31,000 cubic yards

Tier 3 Water Column Bioassay Run

Lowest EC50 = 86.4 Percent Elutriate
Dilution Required = 116

Placement Volume = 31,000 cubic yards

STFATE Model Inputs: Pensacola East Channel

INPUT PARAMETER	UNITS	VALUE
SITE DESCRIPTION		
Disposal Site Name		Pensacola ODMDS
Number of grid points (L-R, +z dir)		96
Number of grid points (T-B, +x dir)		96
Grid spacing (Left to Right) Z-Axis	ft	250
Grid spacing (Top to Bottom) X-Axis	ft	250
Constant water depth	ft	75
Bottom roughness	ft	0.005
Bottom slope (x-dir)	deg	0
Bottom slope (z-dir)	deg	0
Number of points in density profile		3
	1 g/cc	1.0248
	36 g/cc	1.0267
	75 g/cc	1.0271

AMBIENT VELOCITY

Type of velocity profile (>= 0.1 fps)		Depth-Averaged
		Yes
	Depth ft	Velocity X (fps)
	30	0.000
	56	0
		-0.750
		-0.530

STFATE Model Inputs: Pensacola East Channel

INPUT PARAMETER	UNITS	VALUE
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DISPOSAL OPERATION

Disposal point top of grid (X-Axis)	ft	11,250
Disposal point left edge of grid (Z-Axis)	ft	16,875
Dumping Over Depression	No	
Bottom depression length x-direction	ft	0
Bottom depression length z-direction	ft	0
Bottom depression average depth	ft	0
Location of Disposal Site		
Upper Left Corner Distance from Top Edge (X)	ft	6,000
Upper Left Corner Distance from Left Edge (Z)	ft	4,000
Lower Right Corner Distance from Top Edge (X)	ft	16,500
Lower Right Corner Distance from Left Edge (Z)	ft	19,500
Length of vessel bin	ft	319
Width of vessel bin	ft	59
Distance Between Bins	ft	5
Predisposal draft	ft	25.5
Postdisposal draft	ft	13
Time to empty vessel	s	60
Number of Bins that Open Simultaneously	s	1
Number of Discrete Openings of Sets of Bins	s	1
Vessel velocity in x-direction	ft/s	7
Vessel velocity in z-direction	ft/s	-7
Number of layers		1
Volume of each layer	yd ³	Variable

COEFFICIENTS

Settling coef (BETA)		0.000
Apparent mass coefficient (CM)		1.000
Drag coefficient (CD)		0.500
Form drag collapse cloud (CDRAG)		1.000
Skin friction collapse cloud (CFRIC)		0.010
Drag ellipse wedge (CD3)		0.100
Drag plate (CD4)		1.000
Friction between cloud and bottom (FRICTN)		0.010
4/3 Law horizontal diffusion coefficient (ALAMDA)		0.001
Unstratified vertical diffusion coefficient (AKY0)		Pritchard Expression
Cloud/ambient density gradient ratio (GAMA)		0.250
Turbulent thermal entrainment (ALPHA0)		0.235
Entrainment collapse (ALPHAC)		0.100
Stripping factor (CSTRIP)		0.003

STFATE Model Inputs: Pensacola East Channel

INPUT PARAMETER	UNITS	VALUE
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INPUT, EXECUTION & OUTPUT KEYS

Process to simulate		Disp. from Split-Hull Barge/Scow
Duration of simulation	s	14,400
Long Term Time Step	s	600
Convective descent output		
Collapse phase output option		
Number of print times for diffusion		
Number of depths for output		3
Depths for output	ft	1, 36, 75

DREDGE MATERIAL

Location		Pensacola Inner Harbor
Bulking Factor		1.7 (sand/gravel), 2.5 (silt/clay)

Water Quality - Tier II

Contaminant		Ammonia
Acute Water Quality Criteria at Edge of Mixing Zone (C_{wq})	mg/L	1.92
Predicted initial concentration in fluid (C_s)	mg/L	16
Background concentration (C_{ds})	mg/L	0.13
Dilution Required (D_r)		8

Toxicity - Tier III

Lowest

EC50	% Elutriate	86
0.01 EC50	% Elutriate	0.86
Dilution Required		115

Summary of STFATE Modeling for Placement of Dredged Material from the Pensacola East Channel into the Pensacola Offshore ODMDS.

Placement Volume (cuy)	1-hr		4-hrs		Tier II WQ Violation?	Tier III WQ Violation?
	Dilution Factor	Feet Traveled	Dilution Factor	Feet Traveled	Dilution Required = 8	Dilution Required = 115
4,000	30	1,463	580	5,647	No	No
20,000	7	1,700	128	6,644	No	No
30,000	12	1,463	124	5,647	No	No
31,000	10	1,463	120	5,647	No	No
32,000	10	1,463	115	5,647	No	Yes
33,000	10	1,700	113	5,647	No	Yes

Pensacola East Channel Tier II - 31000 cu yd

Pensacola East Channel - Tier II -31000 cu yd

←→

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: Pensacola East Channel - Tier II -31000 cu yd

FILE: TmpFile.DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT)
AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT #25 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #67 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT #17 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #79 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

VERTICAL DIFFUSION COEFFICIENT (AKYO) COMPUTED FROM Pritchard EQUATION
(IPRIT = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND
TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER II OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WATER QUALITY WITH CRITERIA (KEY3 = 2).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED
(IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 3
DEPTH(S):

Pensacola East Channel Tier II - 31000 cu yd
 1.00 FT
 36.00 FT
 75.00 FT

[♀] GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96
 NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96
 GRID SPACING IN Z-DIRECTION (DZ) = 250.00000 FT
 GRID SPACING IN X-DIRECTION (DX) = 250.00000 FT
 CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 75.00000 FT.

[♀] DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
2	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
3	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
4	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
5	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
6	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
7	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
8	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
9	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
10	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
11	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
12	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
13	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
14	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
15	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
16	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
17	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
18	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
19	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
20	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
21	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
22	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.

LEGEND FOR CODED GRID: W = WATER POINT
L = LAND POINT
O = OPEN BOUNDARY
B = DISPOSAL SITE BOUNDARY
D = DUMP LOCATION
X = DUMMY POINT

NUMBER OF GRID POINTS WITHIN ESTUARY = 8464

DISPOSAL LOCATION:

THE DUMP LOCATION IS 0.1125E+05 FT (XBARGE) OR ABOUT GRID POINT #46 FROM
THE TOP OF THE GRID
AND 0.1688E+05 FT (ZBARGE) OR ABOUT GRID POINT #69 FROM THE LEFT EDGE
OF THE GRID.

THE BOTTOM SLOPE IN THE X-DIRECTION AT THE DUMP SITE (SLOPEX, POSITIVE IF DEPTH INCREASES FROM TOP OF GRID TO BOTTOM OF GRID) IS 0.00 DEGREES.

THE BOTTOM SLOPE IN THE Z-DIRECTION AT THE DUMP SITE (SLOPEZ, POSITIVE IF DEPTH INCREASES)

Pensacola East Channel Tier II - 31000 cu yd
FROM LEFT SIDE OF GRID TO RIGHT SIDE OF GRID) IS 0.00 DEGREES.

THE DISPOSAL LOCATION IS NOT AT A HOLE OR DEPRESSION. (DHOLE = 0.0)

AMBIENT DENSITY PROFILE:

DEPTH (FT)	DENSITY (G/CC)
0.0000E+00	1.0248
36.00	1.0267
75.00	1.0271

COMPUTED DEPTH:

THE DEPTH AT THE DUMP LOCATION WAS INTERPOLATED TO BE 75.00 FT.

VELOCITY DISTRIBUTION:

TWO-VELOCITY PROFILES ARE SPECIFIED IN BOTH X AND Z DIRECTIONS FOR USE AT ALL GRID POINTS PROVIDING "QUICK LOOKS".

DEPTH IN FT IS ASSUMED CONSTANT AND VELOCITIES IN FPS ARE CONSIDERED STEADY IN TIME.

VELOCITY PROFILE PARAMETERS FOLLOW...

FROM TOP TO BOTTOM ON GRID
FROM LEFT TO RIGHT ON GRID
UPPER: DEPTH, DU1 = 30.0 X-VELOCITY, UU1 = 0.000E+00
DEPTH, DW1 = 30.0 Z-VELOCITY, WW1 = -0.750
LOWER: DEPTH, DU2 = 56.0 X-VELOCITY, UU2 = 0.000E+00
DEPTH, DW2 = 56.0 Z-VELOCITY, WW2 = -0.530

[♀] BOTTOM SHEAR STRESS, LBS/SQ FT:

M N=	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

♀

DURATION OF THE PROGRAM - FREE 16-20 SECONDS

DURATION OF THE SIMULATION - TOTCP = 14400.00 SECONDS

LONG-TERM TIME STEP USED IN THE SIMULATION DT = 600.00 SECONDS

HOPPER DEDUCE DESCRIPTION

TOTAL NUMBER OF BINS

NUMBER OF BINS OPENING SIMULTANEOUSLY NBLNS = 1

Pensacola East Channel Tier II - 31000 cu yd

NUMBER OF DISCHARGES, NOPENS = 1

LENGTH OF BIN, BINL = 0.32E+03 FT

WIDTH OF BIN, BINW = 59. FT

DISTANCE BETWEEN BINS, TDIS = 5.0 FT

FT SIMULATED LENGTH OF DISCHARGE PARALLEL TO FORE-AFT AXIS, BARGL = 0.32E+03

FT SIMULATED WIDTH OF DISCHARGE PERPENDICULAR TO FORE-AFT AXIS, BARGW = 59.

DRAFT OF LOADED HOPPER DREDGE, DREL1 = 25.5 FT

DRAFT OF UNLOADED HOPPER DREDGE, DREL2 = 13.0 FT

♀ MODEL COEFFICIENTS READ FROM INPUT:

TURBULENT THERMAL ENTRAINMENT ALPHAO = 0.2350

SETTLING COEFFICIENT BETA = 0.0000

APPARENT MASS COEFFICIENT CM = 1.0000

DRAG COEFFICIENT FOR A SPHERE CD = 0.5000

RATIO--CLOUD/AMBIENT DENSITY GRADIENTS GAMA = 0.2500

FORM DRAG FOR COLLAPSING CLOUD CDRAG = 1.0000

SKIN FRICTION FOR COLLAPSING CLOUD CFRIC = 0.0100

DRAG FOR AN ELLIPTICAL WEDGE CD3 = 0.1000

DRAG FOR A PLATE CD4 = 1.0000

ENTRAINMENT IN COLLAPSE ALPHAC = 0.1000

FRICTION BETWEEN CLOUD AND BOTTOM FRICTN = 0.0100

4/3 LAW HORIZ. DIFF. DISSIPATION FACTOR ALAMDA = 0.0010

UNSTRATIFIED WATER VERT. DIFF. COEF. AKYO = 0.0250

STRIPPING COEF. OF FINES DURING CONVECTIVE DESCENT= 0.0030

♀ MATERIAL DESCRIPTION: 4 SOLIDS FRACTIONS

LAYER 1

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)	FALL VELOCITY (FPS)	DEPOSITIONAL VOID RATIO	CHARACTER
Gravel	2.700	0.0000E+00	1.00000	0.5000	

NONCOHESIVE

Critical shear stress for deposition = 99.00 LBS/SQ. FT.
SEDIMENT FRACTION WILL NOT BE STRIPPED DURING CONVECTIVE DESCENT.

Pensacola East Channel Tier II - 31000 cu yd

	SAND	2.700	0.4000E-02	0.10000	0.6000	
NONCOHESIVE	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.2500E-01 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Silt	2.650	0.2600E-01	0.01000	4.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.8500E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Clay	2.650	0.2800E-01	0.00200	7.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.3800E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					

WATER QUALITY ANALYSIS DATA:

CONCENTRATIONS OF Ammonia FOLLOWING INITIAL MIXING OF THE FLUID ARE COMPUTED FOR WATER QUALITY EVALUATIONS.

THE INITIAL CONCENTRATION OF Ammonia IS 16.0000 MG/L AND ITS BACKGROUND CONCENTRATION IS 0.1300000 MG/L.

THE WATER QUALITY CRITERIA FOR Ammonia IS 1.920000 MG/L.

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)
-------------	--------------------------------	------------------------------------

FLUID	1.016	0.9420
-------	-------	--------

[♀] DISCHARGE PARAMETERS:

VOLUME OF LAYER 1 = 0.3100E+05 CU YD

DEPTH IS TOO SHALLOW FOR CONVECTIVE DESCENT SO DESCENT IS BYPASSED.

[♀] CLOUD COLLAPSE PHASE:

IN TRIAL #1 THE COLLAPSE PHASE TIME STEP (DT) WAS 0.17658699E-02 SECONDS. THE TOTAL NUMBER OF INTEGRATION TIME STEPS (I STEP) FOR CONVECTIVE DESCENT AND COLAPSE WAS 1199. THE INTEGRATION TIME STEP NUMBER WHEN THE BED WAS ENCOUNTERED (IBED) WAS 200. THE BOTTOM WAS ENCOUNTERED DURING CONVECTIVE DESCENT. THE DISCHARGE DID NOT OBTAIN A NEUTRALLY BUOYANT CONDITION DURING CONVECTIVE DESCENT.

IN TRIAL #2 THE COLLAPSE PHASE TIME STEP (DT) WAS 0.29401735E-02 SECONDS. THE TOTAL NUMBER OF INTEGRATION TIME STEPS (I STEP) FOR CONVECTIVE DESCENT AND COLAPSE WAS 1199. THE INTEGRATION TIME STEP NUMBER WHEN THE BED WAS ENCOUNTERED (IBED) WAS 200. THE BOTTOM WAS ENCOUNTERED DURING CONVECTIVE DESCENT. THE DISCHARGE DID NOT OBTAIN A NEUTRALLY BUOYANT CONDITION DURING CONVECTIVE DESCENT.

IN TRIAL #3 THE COLLAPSE PHASE TIME STEP (DT) WAS 0.48953891E-02 SECONDS.

		Pensacola East Channel	Tier II - 31000 cu yd			
0.000E+00	3.17	0.130E+00 58.6	0.226E+00	0.356E+00	11750.	12500.
0.000E+00	3.33	0.130E+00 58.6	0.202E+00	0.332E+00	11750.	12250.
0.000E+00	3.50	0.130E+00 58.6	0.181E+00	0.311E+00	11750.	12000.
0.000E+00	3.67	0.130E+00 58.6	0.162E+00	0.292E+00	11750.	11750.
0.000E+00	3.83	0.130E+00 58.6	0.146E+00	0.276E+00	11750.	11500.
0.000E+00	4.00	0.130E+00 58.6	0.132E+00	0.262E+00	11750.	11250.
0.000E+00		0.130E+00				

RESULT: THE WATER QUALITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

♀

Pensacola East Channel Tier III - 31000 cu yd

Pensacola East Channel - Tier III-31000 cu yd

←→

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: Pensacola East Channel - Tier III-31000 cu yd

FILE: TmpFile.DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT)
AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT #25 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #67 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT #17 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #79 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

VERTICAL DIFFUSION COEFFICIENT (AKYO) COMPUTED FROM Pritchard EQUATION
(IPRIT = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND
TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER III OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WITH TOXICITY CRITERIA (KEY3 = 3).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED
(IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 3
DEPTH(S):

Pensacola East Channel Tier III - 31000 cu yd
 1.00 FT
 36.00 FT
 75.00 FT

[♀] GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96
 NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96
 GRID SPACING IN Z-DIRECTION (DZ) = 250.00000 FT
 GRID SPACING IN X-DIRECTION (DX) = 250.00000 FT
 CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 75.00000 FT.

[♀] DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
2	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
3	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
4	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
5	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
6	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
7	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
8	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
9	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
10	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
11	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
12	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
13	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
14	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
15	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
16	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
17	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
18	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
19	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
20	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
21	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
22	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.

LEGEND FOR CODED GRID: W = WATER POINT
L = LAND POINT
O = OPEN BOUNDARY
B = DISPOSAL SITE BOUNDARY
D = DUMP LOCATION
X = DUMMY POINT

NUMBER OF GRID POINTS WITHIN ESTUARY = 8464

+ DI SPOSAL LOCATION:

THE DUMP LOCATION IS 0.1125E+05 FT (XBARGE) OR ABOUT GRID POINT #46 FROM THE TOP OF THE GRID
AND 0.1688E+05 FT (ZBARGE) OR ABOUT GRID POINT #69 FROM THE LEFT EDGE OF THE GRID.

THE BOTTOM SLOPE IN THE X-DIRECTION AT THE DUMP SITE (SLOPEX, POSITIVE IF DEPTH INCREASES FROM TOP OF GRID TO BOTTOM OF GRID) IS 0.00 DEGREES.

THE BOTTOM SLOPE IN THE Z-DIRECTION AT THE DUMP SITE (SLOPEZ, POSITIVE IF DEPTH INCREASES)

Pensacola East Channel Tier III - 31000 cu yd
FROM LEFT SIDE OF GRID TO RIGHT SIDE OF GRID) IS 0.00 DEGREES.

THE DISPOSAL LOCATION IS NOT AT A HOLE OR DEPRESSION. (DHOLE = 0.0)

AMBIENT DENSITY PROFILE:

DEPTH (FT)	DENSITY (G/CC)
0.0000E+00	1.0248
36.00	1.0267
75.00	1.0271

COMPUTED DEPTH:

THE DEPTH AT THE DUMP LOCATION WAS INTERPOLATED TO BE 75.00 FT.

VELOCITY DISTRIBUTION:

TWO-VELOCITY PROFILES ARE SPECIFIED IN BOTH X AND Z DIRECTIONS FOR USE AT ALL GRID POINTS PROVIDING "QUICK LOOKS".

DEPTH IN FT IS ASSUMED CONSTANT AND VELOCITIES IN FPS ARE CONSIDERED STEADY IN TIME.

VELOCITY PROFILE PARAMETERS FOLLOW...

FROM TOP TO BOTTOM ON GRID
FROM LEFT TO RIGHT ON GRID
UPPER: DEPTH, DU1 = 30.0 X-VELOCITY, UU1 = 0.000E+00
DEPTH, DW1 = 30.0 Z-VELOCITY, WW1 = -0.750
LOWER: DEPTH, DU2 = 56.0 X-VELOCITY, UU2 = 0.000E+00
DEPTH, DW2 = 56.0 Z-VELOCITY, WW2 = -0.530

[♀] BOTTOM SHEAR STRESS, LBS/SQ FT:

M N=	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

♀ TIME-PARAMETERS

DURATION OF THE DISPOSAL TREEL (S-22 SECONDS)

DURATION OF THE SIMULATION TSTOP 14400.00 SECONDS

LONG-TERM TIME STEP USED IN THE SIMULATION - DT = 600.00 SECONDS

HOPPER DEDUCE DESCRIPTION

TOTAL NUMBER OF BINS

NUMBER OF BINS OPENING SIMULTANEOUSLY NBLNS = 1

Pensacola East Channel Tier III - 31000 cu yd

NUMBER OF DISCHARGES, NOPENS = 1

LENGTH OF BIN, BINL = 0.32E+03 FT

WIDTH OF BIN, BINW = 59. FT

DISTANCE BETWEEN BINS, TDIS = 5.0 FT

FT SIMULATED LENGTH OF DISCHARGE PARALLEL TO FORE-AFT AXIS, BARGL = 0.32E+03

FT SIMULATED WIDTH OF DISCHARGE PERPENDICULAR TO FORE-AFT AXIS, BARGW = 59.

DRAFT OF LOADED HOPPER DREDGE, DREL1 = 25.5 FT

DRAFT OF UNLOADED HOPPER DREDGE, DREL2 = 13.0 FT

♀ MODEL COEFFICIENTS READ FROM INPUT:

TURBULENT THERMAL ENTRAINMENT ALPHAO = 0.2350

SETTLING COEFFICIENT BETA = 0.0000

APPARENT MASS COEFFICIENT CM = 1.0000

DRAG COEFFICIENT FOR A SPHERE CD = 0.5000

RATIO--CLOUD/AMBIENT DENSITY GRADIENTS GAMA = 0.2500

FORM DRAG FOR COLLAPSING CLOUD CDRAG = 1.0000

SKIN FRICTION FOR COLLAPSING CLOUD CFRIC = 0.0100

DRAG FOR AN ELLIPTICAL WEDGE CD3 = 0.1000

DRAG FOR A PLATE CD4 = 1.0000

ENTRAINMENT IN COLLAPSE ALPHAC = 0.1000

FRICTION BETWEEN CLOUD AND BOTTOM FRICTN = 0.0100

4/3 LAW HORIZ. DIFF. DISSIPATION FACTOR ALAMDA = 0.0010

UNSTRATIFIED WATER VERT. DIFF. COEF. AKYO = 0.0250

STRIPPING COEF. OF FINES DURING CONVECTIVE DESCENT= 0.0030

♀ MATERIAL DESCRIPTION: 4 SOLIDS FRACTIONS

LAYER 1

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)	FALL VELOCITY (FPS)	DEPOSITIONAL VOID RATIO	CHARACTER
Gravel	2.700	0.0000E+00	1.00000	0.5000	

NONCOHESIVE

Critical shear stress for deposition = 99.00 LBS/SQ. FT.
SEDIMENT FRACTION WILL NOT BE STRIPPED DURING CONVECTIVE DESCENT.

Pensacola East Channel Tier III - 31000 cu yd

	SAND	2.700	0.4000E-02	0.10000	0.6000	
NONCOHESIVE	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.2500E-01 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Silt	2.650	0.2600E-01	0.01000	4.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.8500E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Clay	2.650	0.2800E-01	0.00200	7.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.3800E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					

TOXICITY ANALYSIS DATA:

CONCENTRATIONS OF FLUID IN TERMS OF PERCENT OF THE DREDGED MATERIAL FOLLOWING INITIAL MIXING ARE COMPUTED FOR WATER QUALITY EVALUATIONS.

THE INITIAL CONCENTRATION OF FLUID IS 100. PERCENT AND ITS BACKGROUND CONCENTRATION IS 0.000E+00 PERCENT.

THE DILUTION REQUIRED TO MEET TOXICITY CRITERIA IS 0.860000 PERCENT. (TYPICALLY, 1 PERCENT OF THE LC50)

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)
-------------	--------------------------------	------------------------------------

FLUID	1.016	0.9420
-------	-------	--------

DISCHARGE PARAMETERS:

VOLUME OF LAYER 1 = 0.3100E+05 CU YD

DEPTH IS TOO SHALLOW FOR CONVECTIVE DESCENT SO DESCENT IS BYPASSED.

CLOUD COLLAPSE PHASE:

IN TRIAL #1 THE COLLAPSE PHASE TIME STEP (DT) WAS 0.17658699E-02 SECONDS. THE TOTAL NUMBER OF INTEGRATION TIME STEPS (I STEP) FOR CONVECTIVE DESCENT AND COLAPSE WAS 1199.

THE INTEGRATION TIME STEP NUMBER WHEN THE BED WAS ENCOUNTERED (IBED) WAS 200.

THE BOTTOM WAS ENCOUNTERED DURING CONVECTIVE DESCENT.
THE DISCHARGE DID NOT OBTAIN A NEUTRALLY BUOYANT CONDITION DURING CONVECTIVE DESCENT.

IN TRIAL #2 THE COLLAPSE PHASE TIME STEP (DT) WAS 0.29401735E-02 SECONDS. THE TOTAL NUMBER OF INTEGRATION TIME STEPS (I STEP) FOR CONVECTIVE DESCENT AND COLAPSE WAS 1199.

THE INTEGRATION TIME STEP NUMBER WHEN THE BED WAS ENCOUNTERED (IBED) WAS 200.

THE BOTTOM WAS ENCOUNTERED DURING CONVECTIVE DESCENT.
THE DISCHARGE DID NOT OBTAIN A NEUTRALLY BUOYANT CONDITION DURING CONVECTIVE DESCENT.

	Pensacola	East Channel	Tier III	- 31000 cu yd	
2. 00	75. 0	0. 465E+00	11750.	14250.	0. 000E+00
2. 17	75. 0	0. 407E+00	11750.	14000.	0. 000E+00
2. 33	75. 0	0. 357E+00	11750.	13750.	0. 000E+00
2. 50	75. 0	0. 313E+00	11750.	13500.	0. 000E+00
2. 67	75. 0	0. 275E+00	11750.	13250.	0. 000E+00
2. 83	75. 0	0. 243E+00	11750.	13000.	0. 000E+00
3. 00	75. 0	0. 215E+00	11750.	12750.	0. 000E+00
3. 17	75. 0	0. 191E+00	11750.	12500.	0. 000E+00
3. 33	75. 0	0. 171E+00	11750.	12250.	0. 000E+00
3. 50	75. 0	0. 153E+00	11750.	12000.	0. 000E+00
3. 67	75. 0	0. 137E+00	11750.	11750.	0. 000E+00
3. 83	75. 0	0. 124E+00	11750.	11500.	0. 000E+00
4. 00	75. 0	0. 112E+00	11750.	11250.	0. 000E+00
0. 17	58. 6	0. 280E+02	11750.	16250.	0. 000E+00
0. 33	58. 6	0. 196E+02	11750.	16000.	0. 000E+00
0. 50	58. 6	0. 167E+02	11750.	16000.	0. 000E+00
0. 67	58. 6	0. 141E+02	11750.	15750.	0. 000E+00
0. 83	58. 6	0. 112E+02	11750.	15500.	0. 000E+00
1. 00	58. 6	0. 876E+01	11750.	15500.	0. 000E+00
1. 17	58. 6	0. 773E+01	11750.	15250.	0. 000E+00
1. 33	58. 6	0. 659E+01	11750.	15000.	0. 000E+00
1. 50	58. 6	0. 554E+01	11750.	14750.	0. 000E+00
1. 67	58. 6	0. 464E+01	11750.	14500.	0. 000E+00
1. 83	58. 6	0. 390E+01	11750.	14500.	0. 000E+00
2. 00	58. 6	0. 343E+01	11750.	14250.	0. 000E+00
2. 17	58. 6	0. 301E+01	11750.	14000.	0. 000E+00
2. 33	58. 6	0. 264E+01	11750.	13750.	0. 000E+00
2. 50	58. 6	0. 231E+01	11750.	13500.	0. 000E+00
2. 67	58. 6	0. 203E+01	11750.	13250.	0. 000E+00
2. 83	58. 6	0. 179E+01	11750.	13000.	0. 000E+00
3. 00	58. 6	0. 159E+01	11750.	12750.	0. 000E+00
3. 17	58. 6	0. 141E+01	11750.	12500.	0. 000E+00
3. 33	58. 6	0. 126E+01	11750.	12250.	0. 000E+00
3. 50	58. 6	0. 113E+01	11750.	12000.	0. 000E+00
3. 67	58. 6	0. 102E+01	11750.	11750.	0. 000E+00
3. 83	58. 6	0. 915E+00	11750.	11500.	0. 000E+00
4. 00	58. 6	0. 826E+00	11750.	11250.	0. 000E+00

RESULT: THE TOXICITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

+

STFATE Model Results

Pensacola Bay Channel

Tier 2 Acute Water Quality Run

Constituent = Ammonia
Dilution Required = 6

Placement Volume = 40,000 cubic yards

Tier 3 Water Column Bioassay Run

Lowest EC50 = 100 Percent Elutriate
Dilution Required = 100

Placement Volume = 40,000 cubic yards

STFATE Model Inputs: Pensacola Bay Channel

INPUT PARAMETER	UNITS	VALUE
SITE DESCRIPTION		
Disposal Site Name		Pensacola ODMDS
Number of grid points (L-R, +z dir)		96
Number of grid points (T-B, +x dir)		96
Grid spacing (Left to Right) Z-Axis	ft	250
Grid spacing (Top to Bottom) X-Axis	ft	250
Constant water depth	ft	75
Bottom roughness	ft	0.005
Bottom slope (x-dir)	deg	0
Bottom slope (z-dir)	deg	0
Number of points in density profile		3
	1 g/cc	1.0248
	36 g/cc	1.0267
	75 g/cc	1.0271

AMBIENT VELOCITY

Type of velocity profile (>= 0.1 fps)		Depth-Averaged
		Yes
	Depth ft	Velocity X (fps)
	30	0.000
	56	0
		-0.750
		-0.530

STFATE Model Inputs: Pensacola Bay Channel

INPUT PARAMETER	UNITS	VALUE
-----------------	-------	-------

DISPOSAL OPERATION

Disposal point top of grid (X-Axis)	ft	11,250
Disposal point left edge of grid (Z-Axis)	ft	16,875
Dumping Over Depression	No	
Bottom depression length x-direction	ft	0
Bottom depression length z-direction	ft	0
Bottom depression average depth	ft	0
Location of Disposal Site		
Upper Left Corner Distance from Top Edge (X)	ft	6,000
Upper Left Corner Distance from Left Edge (Z)	ft	4,000
Lower Right Corner Distance from Top Edge (X)	ft	16,500
Lower Right Corner Distance from Left Edge (Z)	ft	19,500
Length of vessel bin	ft	319
Width of vessel bin	ft	59
Distance Between Bins	ft	5
Predisposal draft	ft	25.5
Postdisposal draft	ft	13
Time to empty vessel	s	60
Number of Bins that Open Simultaneously	s	1
Number of Discrete Openings of Sets of Bins	s	1
Vessel velocity in x-direction	ft/s	7
Vessel velocity in z-direction	ft/s	-7
Number of layers		1
Volume of each layer	yd ³	Variable

COEFFICIENTS

Settling coef (BETA)		0.000
Apparent mass coefficient (CM)		1.000
Drag coefficient (CD)		0.500
Form drag collapse cloud (CDRAG)		1.000
Skin friction collapse cloud (CFRIC)		0.010
Drag ellipse wedge (CD3)		0.100
Drag plate (CD4)		1.000
Friction between cloud and bottom (FRICTN)		0.010
4/3 Law horizontal diffusion coefficient (ALAMDA)		0.001
Unstratified vertical diffusion coefficient (AKY0)		Pritchard Expression
Cloud/ambient density gradient ratio (GAMA)		0.250
Turbulent thermal entrainment (ALPHA0)		0.235
Entrainment collapse (ALPHAC)		0.100
Stripping factor (CSTRIP)		0.003

STFATE Model Inputs: Pensacola Bay Channel

INPUT PARAMETER	UNITS	VALUE
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INPUT, EXECUTION & OUTPUT KEYS

Process to simulate		Disp. from Split-Hull Barge/Scow
Duration of simulation	s	14,400
Long Term Time Step	s	600
Convective descent output		
Collapse phase output option		
Number of print times for diffusion		
Number of depths for output		3
Depths for output	ft	1, 36, 75

DREDGE MATERIAL

Location		Pensacola Inner Harbor
Bulking Factor		1.7 (sand/gravel), 2.5 (silt/clay)

Water Quality - Tier II

Contaminant		Ammonia
Acute Water Quality Criteria at Edge of Mixing Zone (C_{wq})	mg/L	1.92
Predicted initial concentration in fluid (C_s)	mg/L	13
Background concentration (C_{ds})	mg/L	0.13
Dilution Required (D_r)		6

Toxicity - Tier III

		Lowest
EC50	% Elutriate	100
0.01 EC50	% Elutriate	1
Dilution Required		99

Summary of STFATE Modeling for Placement of Dredged Material from the Pensacola Bay Channel into the Pensacola Offshore ODMDS.

Placement Volume (cuy)	1-hr		4-hrs		Tier II WQ Violation?	Tier III WQ Violation?
	Dilution Factor	Feet Traveled	Dilution Factor	Feet Traveled	Dilution Required = 6	Dilution Required = 99
4,000	30	1,463	598	5,647	No	No
40,000	10	1,463	100	5,647	No	No
41,000	10	1,463	97	5,647	No	Yes

Pensacola Bay Channel Tier II - 40000 cu yd

Pensacola Bay Channel - Tier II -40000 cu yd

←→

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: Pensacola Bay Channel - Tier II -40000 cu yd

FILE: TmpFile.DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT)
AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT #25 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #67 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT #17 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #79 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

VERTICAL DIFFUSION COEFFICIENT (AKYO) COMPUTED FROM Pritchard EQUATION
(IPRIT = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND
TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER II OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WATER QUALITY WITH CRITERIA (KEY3 = 2).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED
(IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 3
DEPTH(S):

Pensacola Bay Channel Tier II - 40000 cu yd
 1.00 FT
 36.00 FT
 75.00 FT

[♀] GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96
 NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96
 GRID SPACING IN Z-DIRECTION (DZ) = 250.00000 FT
 GRID SPACING IN X-DIRECTION (DX) = 250.00000 FT
 CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 75.00000 FT.

[♀] DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
2	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
3	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
4	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
5	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
6	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
7	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
8	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
9	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
10	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
11	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
12	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
13	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
14	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
15	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
16	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
17	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
18	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
19	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
20	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
21	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
22	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.

LEGEND FOR CODED GRID: W = WATER POINT
L = LAND POINT
O = OPEN BOUNDARY
B = DISPOSAL SITE BOUNDARY
D = DUMP LOCATION
X = DUMMY POINT

NUMBER OF GRID POINTS WITHIN ESTUARY = 8464

DISPOSAL LOCATION:

THE DUMP LOCATION IS 0.1125E+05 FT (XBARGE) OR ABOUT GRID POINT #46 FROM THE TOP OF THE GRID
AND 0.1688E+05 FT (ZBARGE) OR ABOUT GRID POINT #69 FROM THE LEFT EDGE OF THE GRID.

THE BOTTOM SLOPE IN THE X-DIRECTION AT THE DUMP SITE (SLOPEX, POSITIVE IF DEPTH INCREASES FROM TOP OF GRID TO BOTTOM OF GRID) IS 0.00 DEGREES.

THE BOTTOM SLOPE IN THE Z-DIRECTION AT THE DUMP SITE (SLOPEZ, POSITIVE IF DEPTH INCREASES)

Pensacola Bay Channel Tier II - 40000 cu yd
FROM LEFT SIDE OF GRID TO RIGHT SIDE OF GRID) IS 0.00 DEGREES.

THE DISPOSAL LOCATION IS NOT AT A HOLE OR DEPRESSION. (DHOLE = 0.0)

AMBIENT DENSITY PROFILE:

DEPTH (FT)	DENSITY (G/CC)
0.0000E+00	1.0248
36.00	1.0267
75.00	1.0271

COMPUTED DEPTH:

THE DEPTH AT THE DUMP LOCATION WAS INTERPOLATED TO BE 75.00 FT.

VELOCITY DISTRIBUTION:

TWO-VELOCITY PROFILES ARE SPECIFIED IN BOTH X AND Z DIRECTIONS FOR USE AT ALL GRID POINTS PROVIDING "QUICK LOOKS".

DEPTH IN FT IS ASSUMED CONSTANT AND VELOCITIES IN FPS ARE CONSIDERED STEADY IN TIME.

VELOCITY PROFILE PARAMETERS FOLLOW...

FROM TOP TO BOTTOM ON GRID
FROM LEFT TO RIGHT ON GRID
UPPER: DEPTH, DU1 = 30.0 X-VELOCITY, UU1 = 0.000E+00
DEPTH, DW1 = 30.0 Z-VELOCITY, WW1 = -0.750
LOWER: DEPTH, DU2 = 56.0 X-VELOCITY, UU2 = 0.000E+00
DEPTH, DW2 = 56.0 Z-VELOCITY, WW2 = -0.530

[♀] BOTTOM SHEAR STRESS, LBS/SQ FT:

M N=	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

	Pensacola Bay	Channel	Tier	II	- 40000 cu yd
49	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
51	0.0000	0.0000	0.0000	0.0000	0.0000
52	0.0000	0.0000	0.0000	0.0000	0.0000
53	0.0000	0.0000	0.0000	0.0000	0.0000
54	0.0000	0.0000	0.0000	0.0000	0.0000
55	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
57	0.0000	0.0000	0.0000	0.0000	0.0000
58	0.0000	0.0000	0.0000	0.0000	0.0000
59	0.0000	0.0000	0.0000	0.0000	0.0000
60	0.0000	0.0000	0.0000	0.0000	0.0000
61	0.0000	0.0000	0.0000	0.0000	0.0000
62	0.0000	0.0000	0.0000	0.0000	0.0000
63	0.0000	0.0000	0.0000	0.0000	0.0000
64	0.0000	0.0000	0.0000	0.0000	0.0000
65	0.0000	0.0000	0.0000	0.0000	0.0000
66	0.0000	0.0000	0.0000	0.0000	0.0000
67	0.0000	0.0000	0.0000	0.0000	0.0000
68	0.0000	0.0000	0.0000	0.0000	0.0000
69	0.0000	0.0000	0.0000	0.0000	0.0000
70	0.0000	0.0000	0.0000	0.0000	0.0000
71	0.0000	0.0000	0.0000	0.0000	0.0000
72	0.0000	0.0000	0.0000	0.0000	0.0000
73	0.0000	0.0000	0.0000	0.0000	0.0000
74	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
76	0.0000	0.0000	0.0000	0.0000	0.0000
77	0.0000	0.0000	0.0000	0.0000	0.0000
78	0.0000	0.0000	0.0000	0.0000	0.0000
79	0.0000	0.0000	0.0000	0.0000	0.0000
80	0.0000	0.0000	0.0000	0.0000	0.0000
81	0.0000	0.0000	0.0000	0.0000	0.0000
82	0.0000	0.0000	0.0000	0.0000	0.0000
83	0.0000	0.0000	0.0000	0.0000	0.0000
84	0.0000	0.0000	0.0000	0.0000	0.0000
85	0.0000	0.0000	0.0000	0.0000	0.0000
86	0.0000	0.0000	0.0000	0.0000	0.0000
87	0.0000	0.0000	0.0000	0.0000	0.0000
88	0.0000	0.0000	0.0000	0.0000	0.0000
89	0.0000	0.0000	0.0000	0.0000	0.0000
90	0.0000	0.0000	0.0000	0.0000	0.0000
91	0.0000	0.0000	0.0000	0.0000	0.0000
92	0.0000	0.0000	0.0000	0.0000	0.0000
93	0.0000	0.0000	0.0000	0.0000	0.0000
94	0.0000	0.0000	0.0000	0.0000	0.0000
95	0.0000	0.0000	0.0000	0.0000	0.0000
96	0.0000	0.0000	0.0000	0.0000	0.0000

♀ TIME PARAMETERS

DURATION OF THE DISPOSAL TREEL (S-22 SECONDS)

DURATION OF THE SIMULATION TSTOP 14400.00 SECONDS

LONG-TERM TIME STEP USED IN THE SIMULATION - DT = 600.00 SECONDS

HOPPER PREFACE DESCRIPTION

TOTAL NUMBER OF BINS

NUMBER OF BINS OPENING SIMULTANEOUSLY NBLNS = 1

Pensacola Bay Channel Tier II - 40000 cu yd

NUMBER OF DISCHARGES, NOPENS = 1

LENGTH OF BIN, BINL = 0.32E+03 FT

WIDTH OF BIN, BINW = 59. FT

DISTANCE BETWEEN BINS, TDIS = 5.0 FT

FT SIMULATED LENGTH OF DISCHARGE PARALLEL TO FORE-AFT AXIS, BARGL = 0.32E+03

FT SIMULATED WIDTH OF DISCHARGE PERPENDICULAR TO FORE-AFT AXIS, BARGW = 59.

DRAFT OF LOADED HOPPER DREDGE, DREL1 = 25.5 FT

DRAFT OF UNLOADED HOPPER DREDGE, DREL2 = 13.0 FT

♀ MODEL COEFFICIENTS READ FROM INPUT:

TURBULENT THERMAL ENTRAINMENT ALPHAO = 0.2350

SETTLING COEFFICIENT BETA = 0.0000

APPARENT MASS COEFFICIENT CM = 1.0000

DRAG COEFFICIENT FOR A SPHERE CD = 0.5000

RATIO--CLOUD/AMBIENT DENSITY GRADIENTS GAMA = 0.2500

FORM DRAG FOR COLLAPSING CLOUD CDRAG = 1.0000

SKIN FRICTION FOR COLLAPSING CLOUD CFRIC = 0.0100

DRAG FOR AN ELLIPTICAL WEDGE CD3 = 0.1000

DRAG FOR A PLATE CD4 = 1.0000

ENTRAINMENT IN COLLAPSE ALPHAC = 0.1000

FRICTION BETWEEN CLOUD AND BOTTOM FRICTN = 0.0100

4/3 LAW HORIZ. DIFF. DISSIPATION FACTOR ALAMDA = 0.0010

UNSTRATIFIED WATER VERT. DIFF. COEF. AKYO = 0.0250

STRIPPING COEF. OF FINES DURING CONVECTIVE DESCENT= 0.0030

♀ MATERIAL DESCRIPTION: 4 SOLIDS FRACTIONS

LAYER 1

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)	FALL VELOCITY (FPS)	DEPOSITIONAL VOID RATIO	CHARACTER
Gravel	2.700	0.0000E+00	1.00000	0.5000	

NONCOHESIVE

Critical shear stress for deposition = 99.00 LBS/SQ. FT.
SEDIMENT FRACTION WILL NOT BE STRIPPED DURING CONVECTIVE DESCENT.

Pensacola Bay Channel Tier II - 40000 cu yd

	SAND	2.700	0.7000E-02	0.10000	0.6000	
NONCOHESIVE	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.2500E-01 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Silt	2.650	0.4900E-01	0.01000	4.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.8500E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					
	Clay	2.650	0.2700E-01	0.00200	7.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.3800E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.					

WATER QUALITY ANALYSIS DATA:

CONCENTRATIONS OF Ammonia FOLLOWING INITIAL MIXING OF THE FLUID ARE COMPUTED FOR WATER QUALITY EVALUATIONS.

THE INITIAL CONCENTRATION OF Ammonia IS 13.0000 MG/L AND ITS BACKGROUND CONCENTRATION IS 0.1300000 MG/L.

THE WATER QUALITY CRITERIA FOR Ammonia IS 1.920000 MG/L.

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)
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FLUID	1.017	0.9170
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DISCHARGE PARAMETERS:

VOLUME OF LAYER 1 = 0.4000E+05 CU YD

DEPTH IS TOO SHALLOW FOR CONVECTIVE DESCENT SO DESCENT IS BYPASSED.

CLOUD COLLAPSE PHASE:

IN TRIAL #1 THE COLLAPSE PHASE TIME STEP (DT) WAS 0.1000000 SECONDS. THE TOTAL NUMBER OF INTEGRATION TIME STEPS (ISTEP) FOR CONVECTIVE DESCENT AND COLAPSE WAS 255. THE INTEGRATION TIME STEP NUMBER WHEN THE BED WAS ENCOUNTERED (IBED) WAS 1. THE BOTTOM WAS ENCOUNTERED DURING CONVECTIVE DESCENT. DIFFUSION OF THE DISCHARGE IS GREATER THAN DYNAMIC SPREADING FROM THE COLLAPSE.

L	TIME FROM ENTRAINED DISPOSAL MASS (SEC)	CLOUD CENTROID X-LOCATION (FT)	CLOUD X-Z WHEN THIS CLOUD WAS CREATED	DEPTH OF PREVIOUS CLOUD (FT)	CLOUD VERT. THICKNESS (FT)	TOTAL MASS (CU FT)
S						
FT)						

NEW CLOUD CREATED, NTCLD(K) (K = 2) = 1	62.50	0.1169E+05	0.1644E+05	211.9	28.50	21.09	504.3
	0.0000E+00	26		1			

		Pensacola	Bay	Channel	Tier	II -	40000	cu yd	
0. 000E+00	2. 83	58. 6		0. 278E+00		0. 408E+00	11750.		13000.
	3. 00	0. 130E+00	58. 6		0. 247E+00		0. 377E+00	11750.	12750.
0. 000E+00		0. 130E+00							
	3. 17	58. 6		0. 220E+00		0. 350E+00	11750.		12500.
0. 000E+00		0. 130E+00							
	3. 33	58. 6		0. 197E+00		0. 327E+00	11750.		12250.
0. 000E+00		0. 130E+00							
	3. 50	58. 6		0. 176E+00		0. 306E+00	11750.		12000.
0. 000E+00		0. 130E+00							
	3. 67	58. 6		0. 159E+00		0. 289E+00	11750.		11750.
0. 000E+00		0. 130E+00							
	3. 83	58. 6		0. 143E+00		0. 273E+00	11750.		11500.
0. 000E+00		0. 130E+00							
	4. 00	58. 6		0. 129E+00		0. 259E+00	11750.		11250.
0. 000E+00		0. 130E+00							

RESULT: THE WATER QUALITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

♀

Pensacola Bay Channel Tier III - 40000 cu yd

Pensacola Bay Channel - Tier III - 40000 cu yd

←→

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: Pensacola Bay Channel - Tier III - 40000 cu yd

FILE: TmpFile.DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT)
AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT #25 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #67 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT #17 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #79 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

VERTICAL DIFFUSION COEFFICIENT (AKYO) COMPUTED FROM Pritchard EQUATION
(IPRIT = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND
TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER III OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WITH TOXICITY CRITERIA (KEY3 = 3).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED
(IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 3
DEPTH(S):

Pensacola Bay Channel Tier III - 40000 cu yd
 1.00 FT
 36.00 FT
 75.00 FT

[♀] GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96
 NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96
 GRID SPACING IN Z-DIRECTION (DZ) = 250.00000 FT
 GRID SPACING IN X-DIRECTION (DX) = 250.00000 FT
 CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 75.00000 FT.

[♀] DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
2	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
3	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
4	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
5	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
6	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
7	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
8	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
9	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
10	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
11	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
12	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
13	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
14	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
15	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
16	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
17	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
18	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
19	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
20	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
21	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
22	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.
75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.	75.

LEGEND FOR CODED GRID: W = WATER POINT
L = LAND POINT
O = OPEN BOUNDARY
B = DISPOSAL SITE BOUNDARY
D = DUMP LOCATION
X = DUMMY POINT

NUMBER OF GRID POINTS WITHIN ESTUARY = 8464

+ DI SPOSAL LOCATION:

THE DUMP LOCATION IS 0.1125E+05 FT (XBARGE) OR ABOUT GRID POINT #46 FROM THE TOP OF THE GRID
AND 0.1688E+05 FT (ZBARGE) OR ABOUT GRID POINT #69 FROM THE LEFT EDGE OF THE GRID.

THE BOTTOM SLOPE IN THE X-DIRECTION AT THE DUMP SITE (SLOPEX, POSITIVE IF DEPTH INCREASES FROM TOP OF GRID TO BOTTOM OF GRID) IS 0.00 DEGREES.

THE BOTTOM SLOPE IN THE Z-DIRECTION AT THE DUMP SITE (SLOPEZ, POSITIVE IF DEPTH INCREASES)

Pensacola Bay Channel Tiber III - 40000 cu yd
FROM LEFT SIDE OF GRID TO RIGHT SIDE OF GRID) IS 0.00 DEGREES.

THE DISPOSAL LOCATION IS NOT AT A HOLE OR DEPRESSION. (DHOLE = 0.0)

AMBIENT DENSITY PROFILE:

DEPTH (FT)	DENSITY (G/CC)
0.0000E+00	1.0248
36.00	1.0267
75.00	1.0271

COMPUTED DEPTH:

THE DEPTH AT THE DUMP LOCATION WAS INTERPOLATED TO BE 75.00 FT.

VELOCITY DISTRIBUTION:

TWO-VELOCITY PROFILES ARE SPECIFIED IN BOTH X AND Z DIRECTIONS FOR USE AT ALL GRID POINTS PROVIDING "QUICK LOOKS".

DEPTH IN FT IS ASSUMED CONSTANT AND VELOCITIES IN FPS ARE CONSIDERED STEADY IN TIME.

VELOCITY PROFILE PARAMETERS FOLLOW...

FROM TOP TO BOTTOM ON GRID
FROM LEFT TO RIGHT ON GRID
UPPER: DEPTH, DU1 = 30.0 X-VELOCITY, UU1 = 0.000E+00
DEPTH, DW1 = 30.0 Z-VELOCITY, WW1 = -0.750
LOWER: DEPTH, DU2 = 56.0 X-VELOCITY, UU2 = 0.000E+00
DEPTH, DW2 = 56.0 Z-VELOCITY, WW2 = -0.530

[♀] BOTTOM SHEAR STRESS, LBS/SQ FT:

M N=	1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17						
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

♀ TIME PARAMETERS

DURATION OF THE DISPOSAL TREES (2-22 SECONDS)

DURATION OF THE SIMULATION TSTOP 14400.00 SECONDS

LONG-TERM TIME STEP USED IN THE SIMULATION - DT = 600.00 SECONDS

HOPPER DEFENCE DESCRIPTION

TOTAL NUMBER OF BINS

NUMBER OF BINS OPENING SIMULTANEOUSLY NBLNS = 1

Pensacola Bay Channel Tier III - 40000 cu yd

NUMBER OF DISCHARGES, NOPENS = 1

LENGTH OF BIN, BINL = 0.32E+03 FT

WIDTH OF BIN, BINW = 59. FT

DISTANCE BETWEEN BINS, TDIS = 5.0 FT

FT SIMULATED LENGTH OF DISCHARGE PARALLEL TO FORE-AFT AXIS, BARGL = 0.32E+03

FT SIMULATED WIDTH OF DISCHARGE PERPENDICULAR TO FORE-AFT AXIS, BARGW = 59.

DRAFT OF LOADED HOPPER DREDGE, DREL1 = 25.5 FT

DRAFT OF UNLOADED HOPPER DREDGE, DREL2 = 13.0 FT

♀ MODEL COEFFICIENTS READ FROM INPUT:

TURBULENT THERMAL ENTRAINMENT ALPHAO = 0.2350

SETTLING COEFFICIENT BETA = 0.0000

APPARENT MASS COEFFICIENT CM = 1.0000

DRAG COEFFICIENT FOR A SPHERE CD = 0.5000

RATIO--CLOUD/AMBIENT DENSITY GRADIENTS GAMA = 0.2500

FORM DRAG FOR COLLAPSING CLOUD CDRAG = 1.0000

SKIN FRICTION FOR COLLAPSING CLOUD CFRIC = 0.0100

DRAG FOR AN ELLIPTICAL WEDGE CD3 = 0.1000

DRAG FOR A PLATE CD4 = 1.0000

ENTRAINMENT IN COLLAPSE ALPHAC = 0.1000

FRICTION BETWEEN CLOUD AND BOTTOM FRICTN = 0.0100

4/3 LAW HORIZ. DIFF. DISSIPATION FACTOR ALAMDA = 0.0010

UNSTRATIFIED WATER VERT. DIFF. COEF. AKYO = 0.0250

STRIPPING COEF. OF FINES DURING CONVECTIVE DESCENT= 0.0030

♀ MATERIAL DESCRIPTION: 4 SOLIDS FRACTIONS

LAYER 1

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)	FALL VELOCITY (FPS)	DEPOSITIONAL VOID RATIO	CHARACTER
Gravel	2.700	0.0000E+00	1.00000	0.5000	

NONCOHESIVE

Critical shear stress for deposition = 99.00 LBS/SQ. FT.
SEDIMENT FRACTION WILL NOT BE STRIPPED DURING CONVECTIVE DESCENT.

Pensacola Bay Channel Tier III - 40000 cu yd

SAND	2.700	0.7000E-02	0.10000	0.6000	
NONCOHESIVE	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.2500E-01 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.				
Silt	2.650	0.4900E-01	0.01000	4.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.8500E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.				
Clay	2.650	0.2700E-01	0.00200	7.500	COHESIVE
	CRITICAL SHEAR STRESS FOR DEPOSITION = 0.3800E-02 LBS/SQ. FT. SEDIMENT FRACTION WILL BE STRIPPED DURING CONVECTIVE DESCENT.				

TOXICITY ANALYSIS DATA:

CONCENTRATIONS OF FLUID IN TERMS OF PERCENT OF THE DREDGED MATERIAL FOLLOWING INITIAL MIXING ARE COMPUTED FOR WATER QUALITY EVALUATIONS.

THE INITIAL CONCENTRATION OF FLUID IS 100. PERCENT AND ITS BACKGROUND CONCENTRATION IS 0.000E+00 PERCENT.

THE DILUTION REQUIRED TO MEET TOXICITY CRITERIA IS 1.00000 PERCENT. (TYPICALLY, 1 PERCENT OF THE LC50)

DESCRIPTION	SPEC. GRAV. OR DENSITY (GM/CC)	VOLUMETRIC CONCENTRATION (VOL/VOL)
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FLUID	1.017	0.9170
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DISCHARGE PARAMETERS:

VOLUME OF LAYER 1 = 0.4000E+05 CU YD

DEPTH IS TOO SHALLOW FOR CONVECTIVE DESCENT SO DESCENT IS BYPASSED.

CLOUD COLLAPSE PHASE:

IN TRIAL #1 THE COLLAPSE PHASE TIME STEP (DT) WAS 0.1000000 SECONDS. THE TOTAL NUMBER OF INTEGRATION TIME STEPS (I STEP) FOR CONVECTIVE DESCENT AND COLAPSE WAS 255. THE INTEGRATION TIME STEP NUMBER WHEN THE BED WAS ENCOUNTERED (IBED) WAS 1.

THE BOTTOM WAS ENCOUNTERED DURING CONVECTIVE DESCENT. DIFFUSION OF THE DISCHARGE IS GREATER THAN DYNAMIC SPREADING FROM THE COLLAPSE.

L	ENTRAINED TIME FROM DISPOSAL (SEC)	CLOUD CENTROID X-LOCATION (FT)	CLOUD Z-LOCATION (FT)	X-Z DIAMETER (FT)	DEPTH OF PREVIOUS CLOUD (FT)	CLOUD VERT. THICKNESS (FT)	TOTAL MASS (CU FT)
S		THIS CLOUD WAS CREATED					
FT)							

NEW CLOUD CREATED, NTCLD(K) (K = 2) = 1
 62.50 0.1169E+05 0.1644E+05 211.9 1 28.50 21.09 504.3

	Pensacola Bay Channel	Tier	III - 40000 cu yd	
1. 50	75. 0	0. 877E+00	11750.	14750. 0. 000E+00
1. 67	75. 0	0. 737E+00	11750.	14500. 0. 000E+00
1. 83	75. 0	0. 623E+00	11750.	14500. 0. 000E+00
2. 00	75. 0	0. 549E+00	11750.	14250. 0. 000E+00
2. 17	75. 0	0. 482E+00	11750.	14000. 0. 000E+00
2. 33	75. 0	0. 423E+00	11750.	13750. 0. 000E+00
2. 50	75. 0	0. 371E+00	11750.	13500. 0. 000E+00
2. 67	75. 0	0. 327E+00	11750.	13250. 0. 000E+00
2. 83	75. 0	0. 289E+00	11750.	13000. 0. 000E+00
3. 00	75. 0	0. 257E+00	11750.	12750. 0. 000E+00
3. 17	75. 0	0. 229E+00	11750.	12500. 0. 000E+00
3. 33	75. 0	0. 204E+00	11750.	12250. 0. 000E+00
3. 50	75. 0	0. 183E+00	11750.	12000. 0. 000E+00
3. 67	75. 0	0. 165E+00	11750.	11750. 0. 000E+00
3. 83	75. 0	0. 149E+00	11750.	11500. 0. 000E+00
4. 00	75. 0	0. 135E+00	11750.	11250. 0. 000E+00
0. 17	58. 6	0. 316E+02	11750.	16250. 0. 000E+00
0. 33	58. 6	0. 222E+02	11750.	16000. 0. 000E+00
0. 50	58. 6	0. 193E+02	11750.	16000. 0. 000E+00
0. 67	58. 6	0. 162E+02	11750.	15750. 0. 000E+00
0. 83	58. 6	0. 129E+02	11750.	15500. 0. 000E+00
1. 00	58. 6	0. 103E+02	11750.	15500. 0. 000E+00
1. 17	58. 6	0. 902E+01	11750.	15250. 0. 000E+00
1. 33	58. 6	0. 770E+01	11750.	15000. 0. 000E+00
1. 50	58. 6	0. 648E+01	11750.	14750. 0. 000E+00
1. 67	58. 6	0. 545E+01	11750.	14500. 0. 000E+00
1. 83	58. 6	0. 461E+01	11750.	14500. 0. 000E+00
2. 00	58. 6	0. 406E+01	11750.	14250. 0. 000E+00
2. 17	58. 6	0. 356E+01	11750.	14000. 0. 000E+00
2. 33	58. 6	0. 313E+01	11750.	13750. 0. 000E+00
2. 50	58. 6	0. 275E+01	11750.	13500. 0. 000E+00
2. 67	58. 6	0. 242E+01	11750.	13250. 0. 000E+00
2. 83	58. 6	0. 214E+01	11750.	13000. 0. 000E+00
3. 00	58. 6	0. 190E+01	11750.	12750. 0. 000E+00
3. 17	58. 6	0. 169E+01	11750.	12500. 0. 000E+00
3. 33	58. 6	0. 151E+01	11750.	12250. 0. 000E+00
3. 50	58. 6	0. 136E+01	11750.	12000. 0. 000E+00
3. 67	58. 6	0. 122E+01	11750.	11750. 0. 000E+00
3. 83	58. 6	0. 110E+01	11750.	11500. 0. 000E+00
4. 00	58. 6	0. 994E+00	11750.	11250. 0. 000E+00

RESULT: THE TOXICITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

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